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CLEAN WATER ACT REAUTHORIZATION

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Clean Water Act Reauthorization, Se... : THE

**SUBCOMMITTEE ON ENVIRONMENT
AND NATURAL RESOURCES**

OF THE

**COMMITTEE ON
MERCHANT MARINE AND FISHERIES
HOUSE OF REPRESENTATIVES**

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

ON

**COST-EFFECTIVE PLANNING TO DISPOSE OF WASTE
WATER IN A SAFE, HEALTHY, AND ENVIRONMENTAL-
LY SOUND MANNER**

JULY 8, 1993—SAN DIEGO, CALIFORNIA

Serial No. 103-42

Printed for the use of the Committee on Merchant Marine and Fisheries



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CLEAN WATER ACT REAUTHORIZATION

THURSDAY, JULY 8, 1993

HOUSE OF REPRESENTATIVES, SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES, COMMITTEE ON MERCHANT MARINE AND FISHERIES

San Diego, CA

The Subcommittee met, pursuant to notice, at 9:30 a.m. at Solis Hall, University of California at San Diego, the Honorable Gerry E. Studds [chairman] presiding.

Representatives present: Studds, Cunningham, and Schenk.

Also present: Representative Filner.

Staff present: Daniel Ashe, Tom Melius, Laurel Bryant, and Marvadell Zeeb.

OPENING STATEMENT OF HON. GERRY E. STUDDS, A U.S. REPRESENTATIVE FROM MASSACHUSETTS, AND CHAIRMAN, SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES

Mr. STUDDS. This meeting will be called to order.

As you can see from the map, the water is on the wrong side. Everything is a little different. I assume those are not clouds outside because if they were it would ruin my theory about this place, which is that you suffer from insufficient suffering.

[Laughter.]

Mr. STUDDS. Therefore, I find it extremely difficult to build character as opposed to characters.

[Laughter.]

Mr. STUDDS. Let me say that in spite of all those differences, I feel somewhat at home. I come from the southeastern part of Massachusetts. The Woods Hole Oceanographic Institution is in my district, so I have an affinity for a place such as this, to put it mildly.

Really I am here on account of how Congresswoman Schenk threatened me if I didn't come. She made it very clear, as did Bob Filner, that the situation confronted by San Diego was of sufficient severity and uniqueness to warrant a visit by the Committee, which will share the responsibility of reauthorizing the Clean Water Act.

I want to thank Lynn, Bob, and Duke Cunningham for their personal hospitality as we visited both northern and southern California in the last couple of days.

In the six years that have elapsed since Congress last reauthorized the Federal Clean Water Act, this Committee has held more hearings on the subject of clean water than any other single topic. Hearings on estuaries, beach quality, funding, sewage sludge, com-

bined sewers, funding, vessel pollution, wetlands protection, funding, watershed management and funding and funding and funding.

[Laughter.]

Mr. STUDDS. You can get some idea of the common theme we are picking up.

I was somewhat reluctant when Ms. Schenk initially asked if we would come here, but she has this remarkable combination of the enthusiasm of a freshman and the persuasiveness of a veteran. She prevailed.

No cities or towns are more familiar with the cost of clean water than those surrounding Boston Harbor, several of which I represent. It is clear that the Clean Water Act has made Boston and San Diego, in some respects, sister cities. They, and more importantly, their ratepayers, are threatened with an unacceptable financial burden.

Let me just say that if you think you are facing potential problems here, the average water and sewer bill for a home around Greater Boston is approximately \$600 a year at the moment, and it is predicted to double in three years, and triple by the end of the century. We already have people whose water and sewer bills are greater than their property taxes, are approaching and will soon pass their mortgage bills.

Clean water is a fundamental societal need. It is not a luxury, but in one important respect—namely, its cost—it is beginning to look a lot like a luxury. That is to say, it is beginning to become unaffordable.

Over the past 20 years this country has made great strides in water quality protection. This progress was fueled by a Federal engine, more costly by far than that which sent men to the moon.

Under the leadership of the past two Administrations, this Nation's clean water engine was replaced with what you might call an economy model. It gets good mileage, but it lacks the power to pull the really heavy loads, like Boston Harbor and San Diego.

As we consider the reauthorization of the Clean Water Act, I hope that our sister cities can work together to help rebuild the Nation's Clean Water engine and find ways to improve the quality of our coastal waters without breaking the budgets and the backs of our ratepaying households.

I want to say that as we begin our work on this, this year, I look forward to having Lynn Schenk and the other members of San Diego's delegation at our side in that effort.

Let me also apologize in advance; because of schedules beyond my control, I must make an airplane headed back to where the water is on the right side today. In all likelihood, that will necessitate my departure prior to the conclusion of the hearing.

My apologies to anyone that I miss. The professional staff, who knows far more than I do, will still be here. If that occurs, I will ask Ms. Schenk to assume the Chair.

Having said that, let me recognize members for their opening statements, starting with my magnificent host, Ms. Schenk.

STATEMENT OF HON. LYNN SCHENK, A U.S. REPRESENTATIVE
FROM CALIFORNIA

Ms. SCHENK. Thank you very much, Mr. Chairman.

I want to, first of all, extend my personal welcome to you to San Diego where we do think that the ocean is on the right side.

[Laughter.]

Mr. STUDDS. Oh, well.

Ms. SCHENK. That is a debate for another time.

But I also want to express to you my heartfelt appreciation for your willingness to make the effort and take the time to come across the country. I understand it was quite a circuitous route for you.

I am personally deeply grateful. You have the gratitude of our entire community and that you and the staff are willing to come here and hear directly from San Diegans about our 20-plus years experience with the Clean Water Act.

I also want to acknowledge and thank my colleague on our Committee, the Merchant Marine and Fisheries Commission, Randy Cunningham, who today is the ranking Republican on the Committee—I tried it on for size, Randy—and a colleague who is not a member of our Committee, but who has had a great deal of interest and experience in this area, Congressman Bob Filner.

Mr. Chairman, their presence here underscores to you and to the Committee as a whole the importance of this issue to San Diego, and that it cuts across partisan lines.

San Diego has been striving for 30 years to dispose of its waste water in a safe, healthy, and environmentally sound manner. In fact, shortly before the 1972 amendments to the Federal Water Pollution Control Act initiated the Federal effort to clean up our waters, San Diego received a Federal commendation for protecting our local waters from sewage contamination.

Since then, our city has made major improvements, but unfortunately it has come into technical conflict with the Clean Water Act, resulting in on-going legal proceedings.

For more than a decade, we have been embroiled in controversy as to what would be the most cost effective, what would be the best plan for San Diego. It has been a long and tedious process. We hope that there is a light at the end of that particular tunnel.

I think that we can learn a lot from today's problems here in San Diego in dealing with the Clean Water Act. Today you will be hearing from a broad cross-section of our community—our political leadership, our local leadership, the experts right here in San Diego, the scientific experts and the technical experts. I, for one, look forward to their testimony. I know that it will be invaluable to our work.

Mr. Chairman, I have a longer statement. I would ask that it be submitted for the record. I will, at this point close as I started by saying thank you very much on behalf of all of San Diego for your effort to come here today.

Mr. STUDDS. Thank you very much, Ms. Schenk.

[The prepared statement of Ms. Schenk follows:]

STATEMENT OF HON. LYNN SCHENK, A U.S. REPRESENTATIVE FROM CALIFORNIA

Thank you, Mr. Chairman. By way of introduction to this hearing on San Diego's experience with the Clean Water Act (CWA), I would like to review some of that history and bring into focus the difficulties arising from the Act's technology-based standard for municipal sewerage treatment plants, in particular, the requirement for "secondary treatment."

The San Diego Metropolitan Sewerage System (SDMSS) was designed and built in the early nineteen sixties to address existing water quality problems in San Diego Bay. SDMSS consolidates the waste water from nine cities, Chula Vista, Coronado, El Cajon, Imperial Beach, La Mesa, National City, Poway, Del Mar, and San Diego, as well as from eight independent sanitary districts; Lemon Grove, Montgomery, Lakeside, Alpine, Padre Dam, Otay, Wintergarden, and Spring Valley. The system is also required to treat some sewerage from Tijuana, Mexico. Prior to the SDMSS consolidation, the effluent from these separate systems was discharged directly into the bay or ocean.

The SDMSS's primary treatment facility at Point Loma discharges through an outfall stretching two and a half miles out into the Pacific and reaching a depth of 200 feet. Currently, the Point Loma plant processes between 175 and 185 million gallons of sewerage each day. Sludge from the plant is dried on Fiesta Island in Mission Bay and composted for use in soil conditioners or, as a last resort, disposed of in landfills.

In 1979, San Diego applied for a section 301(H) waiver from the CWA's secondary treatment requirement based on its belief that the rapid, 110 to 1, dilution achieved at the end of the extended outfall was sufficient to meet secondary treatment standard results. The EPA granted a tentative approval. In 1983, the city submitted a revised waiver application based on new flow projections and plans to treat sewerage from Tijuana, Mexico.

Between 1979 and 1992, San Diego made several improvements in its treatment system. By upgrading and chemically enhancing its primary treatment process, the Point Loma Facility was able to increase the efficiency of solids removal from 55% to between 75% and 80%. The SDMSS believes that this rate can be further improved to meet the 85% removal rate required by the secondary treatment standards, and tests are currently being run to determine if this is correct.

In 1986, the EPA tentatively denied both the 1979 and 1983 secondary treatment waiver applications because of the system's lack of compliance with the California Ocean Plan. That plan had been revised in 1983 to require body-contact bacteriological standards for all kelp beds. Although the Point Loma outfall discharges some 6,000 feet beyond the nearest kelp bed, ocean currents at times carry the plume into the kelp beds and bacteriologic standards are exceeded. Field studies have shown that these discharges were not adversely affecting divers or the kelp beds, and on that basis, San Diego had applied to the California Regional Water Quality Control Board for an exemption to the kelp standard. That application was also denied in 1986.

The next year, the San Diego City Council voted to withdraw the waiver applications and to come into compliance with the CWA by converting Point Loma to a biological secondary treatment plant. The Council also committed to developing an ambitious water reclamation and reuse program and established the San Diego Clean Water Program charged with carrying out these goals.

Subsequently, the EPA filed suit against the city for violations of the CWA and the California Ocean Plan. Between 1987 and 1990, San Diego developed a plan to come into compliance, which included upgrading the collection system, complying with bacterial standards in the kelp beds, upgrading the Point Loma plant to secondary treatment, building a second secondary treatment plant, and constructing six water reclamation plants. The project cost was \$2.4 billion in 1990. Rates were projected at \$360 per household upon completion.

In 1990, the EPA and San Diego entered into a consent decree which would make the proposed plan and its schedule legally enforceable. The presiding Federal judge, however, did not approve the plan, finding that secondary treatment would be costly and would probably fail to achieve significant environmental benefits. Two evidentiary hearings were held on the consent decree and the EPA lawsuit. The court found that the city was in violation of the CWA, that the community of organisms around the Point Loma outfall were not adversely affected by the discharge, but that bacteriological standards were exceeded in the kelp beds, which may have adversely affected the marine environment, and that viruses in the discharge might imperil divers. Subsequently, the judge ruled that San Diego could meet the bacteri-

ological standards in the kelp beds by extending the outfall. Such an extension, to 4.5 miles out and 320 feet deep, is currently under construction.

In the end, the judge deferred his final decision to early 1993 and later extended that to mid-1993. He did fine the city \$3 million for violations of the CWA. The city was given the option of paying only \$0.5 million in fines and enacting a water conservation ordinance and spending at least \$2.5 million on water conservation projects. The city was, however, to proceed with all aspects of the consent decree as if it were in effect.

In September, 1992, the court modified its interim order to allow San Diego to proceed with a scaled-down version of the consent decree called the "consumers' alternative." This \$1.3 billion program does not include secondary treatment upgrades, eliminates two of the seven planned water reclamation facilities, delays construction of two others, and assumes that another two will be built by other authorities. The judge suggested that San Diego use the additional time to seek administrative or legislative relief from the secondary treatment requirement at Point Loma, which is what brings us here today.

In 1972, Congress, frustrated by the ineffective implementation of earlier statutes, changed its approach to water quality protection. The 1972 Act established the Federal objective of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. In order to meet this goal, Congress provided for a permit system for regulating the discharge of pollutants. In addition, it established a technology-based standard for publicly owned treatment works (POTWS). The secondary treatment standard for POTWS required all municipal sewerage dischargers to remove at least 85% of the suspended solids and biochemical oxygen demand (BOD) from their waste water.

Many coastal cities, San Diego included, argued that discharges into the open ocean should be exempted from the secondary treatment standard, primarily for two reasons: 1) because ocean currents readily disperse effluent and 2) dissolved oxygen depletion is rarely a problem in open ocean marine environments. These arguments were addressed by the section 301(H) waiver process. San Diego, however, believes that a legislative exemption for deep water outfalls such as Point Loma's would be more appropriate and more cost-effective.

The city of San Diego and some of our experts here today will provide data and scientific justification for a legislative solution. In particular, we will hear about the results of a study by the National Research Council (NRC) on managing waste water in coastal urban areas. That study concluded, in part, that while the 1972 Act made tremendous strides toward cleaning our nation's waters, it was not always adaptable to variations in regional or local conditions.

The NRC Study found that prescribing a specific technological solution to waste water treatment nationwide failed to adequately protect resources in some regions, while it over-protected in others. For one thing, the Council recommends that "coastal waste water and storm water management strategies should be tailored to the characteristics, values, and uses of the particular receiving environment, based on a determination of what combination of control measures can effectively achieve water and sediment quality objectives."¹ The council further recommends that waste water treatment requirements should be developed based on water and sediment quality criteria rather than by technology-based regulations. "Environmental and human health concerns associated with waste water contaminants differ depending on the location and mechanism of their introduction into coastal waters. Accordingly, waste water treatment, sludge disposal practices, and other management controls should be guided by water and sediment quality requirements of the receiving waters."²

Mr. Chairman, it seems to me that there is ample justification for revisiting the Clean Water Act in regard to the secondary treatment requirements. I am looking forward to hearing in greater detail the suggestions and recommendations of our witnesses. I hope that we can take from this hearing good ideas on ways to improve the Clean Water Act in our upcoming considerations.

Now, I will call on the distinguished Republican member from San Diego, Duke Cunningham.

¹National Research Council, *Managing Waste Water in Coastal Urban Areas*, 1993, page 5.

²Ibid, page 8.

**STATEMENT OF HON. RANDY CUNNINGHAM, A U.S.
REPRESENTATIVE FROM CALIFORNIA**

Mr. CUNNINGHAM. Thank you, Mr. Chairman.

First of all, I would like to thank Lynn for asking that you come to our beautiful city of San Diego. I would like to reiterate what Ms. Schenk has said, that Bob Filner, myself, Lynn, Duncan Hunter, and Ron Packard—it has been a bipartisan issue to try to receive funding for the projects that we are doing here. It is not just a San Diego problem. It is a Mexico problem. It is a community problem as well.

Looking at our testimony yesterday, and how long it took, with your indulgence, I would like to submit my statement for the record. I would like to hear from Mayor Golding and Councilwoman Stallings. That would give you more time if I submit this for the record.

I would also like to submit, with unanimous consent, the statement of the great and honorable Jack Fields, who is the ranking member that couldn't be here today.

Mr. CUNNINGHAM. Secondly, when I first came into Congress—actually before I came to Congress, Duncan Hunter brought me down to a hearing right in the Mayor's chamber. I met with Commissioner Ganaji.

So this is not a problem that has just cropped up overnight. It is one that the Mayor and the Councilwoman both know that has been long running. Bob Filner and a lot of folks that have been on the Council and on the Port District with Lynn, have been working on for a long time. It is not an easy solution.

I guess when I got back in Congress and starting listening to the testimony, you kind of isolate yourself and think, "Well, we're the only one that really have this problem."

But there are cities that have been impacted by the Clean Water Act—many, many of them. Congressman Studds knows exactly what I am talking about.

But I would like thank you, Mr. Chairman, and I would like to let the audience know that I serve on three major committees. Of all the committees that I serve on, the most bipartisan, the fairest committee in which Republicans and Democrats work together, is with Chairman Studds.

We have fair hearings. We are allowed to offer our amendments. The rules are based such that we get a fair time and share. He is willing to listen if we have good points. That is the way a committee should work. I would like to commend you, Mr. Chairman.

With that, I would like to press on.

[The prepared statement of Mr. Cunningham follows;]

STATEMENT OF HON. RANDY CUNNINGHAM, A U.S. REPRESENTATIVE FROM CALIFORNIA

I would like to thank Chairman Studds for holding this important field hearing here in San Diego on the reauthorization of the Federal Clean Water Act.

This is a crucial issue to those of us who live in the San Diego area as well as many other cities across the nation. At least 37 percent of the U.S. population is located in counties abutting the ocean or neighboring major estuaries (both of which affect us here in San Diego). It should also be noted that the waste from this population and its associated activities is a major contributor to the degeneration of our oceans and coastal waters.

With this said, however, it is imperative to recognize the progress we have made since 1972 and the implementation of the Federal Clean Water Act. Prior to 1972 the country relied on an inefficient means of water quality standards, but, with the implementation of the Clean Water Act we established a new system of minimum technology-based discharge standards. Furthermore, the Act required more stringent treatment controls for individual discharges if the technology-based controls proved to be inadequate to meet site-specific water quality standards.

Throughout this time period, significant progress has been made in improving San Diego's as well as the nation's water quality. However, current coastal water-quality policies require exactly the same treatment in every location, which results in insufficient protection for some problems and over-protection for others. San Diego is one such city that has made significant improvements to its Point Loma facility. The initial upgrade from primary to chemically-enhanced primary treatment increases the efficiency from about 55 percent to between 75 and 80 percent in 1988. In spite of such progress the city is still faced with problems. The coastal problems remaining, such as combined sewer overflows and nonpoint source pollution, are physically and conceptually more complex than the traditional problems we faced 20 years ago—not to mention that financial resources to address these problems are becoming less available from the Federal level as well as the State and local levels.

For these reasons, it is my feeling that it is time to move forward again, just as we needed to do 20 years ago. This time with the scientific knowledge we have, and the background materials we have collected since the original implementation of the Clean Water Act, we can now look at these problems with a more comprehensive approach to managing coastal waters with a strategy called integrated coastal management.

Integrated Coastal Management aims to protect coastal ecosystems while recognizing the importance of human activities such as boating and commercial fishing. With this new approach, the Federal role in integrated coastal management shifts from that of prescriptive mandate to a partnership with regional authorities in developing a management system that meets coastal-quality objectives. There are already some similarities to this new type of Federal-State cooperation that we are currently observing with the Endangered Species Act and the initiative that Secretary Babbitt has taken with the State of California and the issue of the gnatcatcher. It is my hope that we can set the example for the rest of the country in how to forge new working relationships between Federal and State agencies.

One of the strong points of Integrated Coastal Management is that it would allow a certain amount of flexibility to restore and maintain the integrity of coastal ecosystems, and to maintain the important human values associated with those areas. This new type of coastal management would also broaden the areas that are affecting our coastal environments by taking into account the multiple sources of pollution, and identify and apply the most cost-effective approaches to controlling it.

I support the finding found in the National Research Council's report in stating that these new approaches should be the country's long-range goal. Though these changes can not take place overnight, I do agree with the report, in that some immediate actions should be taken to begin adopting this approach and shifting the initiative for coastal management from the Federal Government to local agencies.

I look forward to hearing from the three panels that will testify today. I know the importance of this hearing and that will be addressing the key issues that we in San Diego must face; it is also my hope that we continue to work together to find a solution to the astronomical costs that are involved with section 301 of the Clean Water Act and secondary treatment requirements. It is my opinion that we in San Diego have much to gain from the concept and implementation of an integrated coastal management system. Again, I would like to thank Chairman Studds for agreeing to hold this hearing here and I look forward to working with him and the other members of the Merchant Marine and Fisheries Committee on this important matter.

[The prepared statement of Mr. Fields follows:]

STATEMENT OF HON. JACK FIELDS, RANKING MINORITY MEMBER, COMMITTEE ON
MERCHANT MARINE AND FISHERIES

Although I am unable to attend the hearing this morning, I want to thank Chairman Studds for scheduling one of his Clean Water Act reauthorization hearings in San Diego. California has a strong presence on the Merchant Marine Committee, including my good friend, Duke Cunningham, who represents this beautiful area and who was instrumental in getting the Subcommittee here. We appreciate having

a Chairman who is willing to go so far—3,000 miles—to capture the flavor of the debate outside Washington on the Clean Water Act.

I understand that the City of San Diego has wrestled long and hard with the need to meet the sanitary needs of its own citizens and the need to protect its magnificent Pacific shore. This is not a battle the City has waged alone, as I am sure the Chairman can agree. San Diego also has the added problem of sewage drifting across the border from Tijuana, and I can empathize, knowing of the environmental hardships suffered by Texas border communities.

The recent National Research Council report has provided some thoughtful points of discussion and debate over sewage treatment needs for our country. Is there truly a need for a national technology-based requirement for publically-owned sewage treatment works? Shouldn't there be a consideration of costs and benefits before imposing billion-dollar water quality requirements on financially strapped communities? Would an integrated approach to coastal pollution which looks at all sources of pollution from all media, prioritizes water quality problems and mandates responsible reduction of pollution at the source be fairer?

I hope all these questions can be answered or at least discussed today and that the deliberations will help guide our debate on this environmental issue and others in the future.

Thank you, Mr. Chairman.

Mr. STUDDS. As long as you are going to talk like that, you can have as much time as you would like.

[Laughter.]

Mr. STUDDS. Thank you very much, Duke Cunningham. I appreciate that.

I don't know if you have noticed, but everybody who works where we do is distinguished by unanimous consent.

[Laughter.]

Mr. STUDDS. My esteemed colleague, Bob Filner.

STATEMENT OF HON. BOB FILNER, A U.S. REPRESENTATIVE FROM CALIFORNIA

Mr. FILNER. Thank you, my distinguished Chairman. My former colleagues on the City Council are wondering how I got to be distinguished. But here I am.

[Laughter.]

Mr. FILNER. Here I am. I want to thank you, Mr. Chairman, for conducting this hearing and being so interested in the issues that concern us here in San Diego.

One of the great things about being a freshman is not only the excitement of the job, but meeting people like Gerry Studds who have worked so long and hard on issues that are important to all of us, and who are also nice human beings at the same time. So, it has been a pleasure.

Mr. STUDDS. You can have as much time as you like, also.

[Laughter.]

Mr. FILNER. Thank you.

Obviously, my colleague, Lynn Schenk, took the lead in bringing this here. We are very appreciative. We are supposed to call our female colleagues the gentlelady from California. I am sure that exactly describes Ms. Schenk. We are pleased that you took the leadership here and for giving us the forum in the City to discuss this issue.

I am here, obviously, as the Congressman from San Diego. I am here as a former member, Mr. Chairman, of the San Diego City Council for the five years previous. I had something to do with

some of the decisions and votes and discussions which lead us to the position that the City is taking today.

Also, of course, as a member of the Public Works and Transportation Committee, which does also have some jurisdiction on the Clean Water Act, we have concluded in that committee a series of hearings on reauthorization, including a hearing on this subject before us today. So, I hope our committees will obviously work together as we proceed.

The Clean Water Act, since its inception 20 years ago, has been a cornerstone, as you all know, of the Nation's efforts to improve water quality. We have seen impressive results, especially in our lakes and rivers.

But the results in the coastal areas have been more mixed. Current law does not address the regional variations or allow us to respond to the changing need in improved technology in this area.

The Clean Water Act prescribes uniform technology base standards, regardless of their applicability to the local environmental situation. A key standard, for example, is biochemical oxygen demand—BOD.

Yet, when dealing with open coastal waters, recent studies indicate that the depletion of dissolved oxygen is generally not of ecological concern. Yet, it is a standard by which we are measuring adherence to environmental standards.

In this context, the National Research Council's report called "Managing Waste Water in Coastal Urban Areas," and its advocacy of an Integrated Coastal Management, or ICM approach, I think it very important for us. ICM gives us a scientific basis for moving away from technology-based regulations, to an environmental quality-based approach.

Under the ICM process, as the report states, the Federal role shifts from that of prescriptive mandate to a partnership with regional authorities in developing a management system that meets coastal quality objectives.

As things have changed over the last 20 years, increased population in our coastal regions, the changing mix of land use activities, increased environmental awareness, demands for a cleaner, more diverse coastal environments, and significant advances in scientific understandings—not to mention our severe budgetary constraints—all of these argued for a new approach to coastal environmental management.

The current law does not allow us to keep pace with increasing pressures and coastal environs, let alone rehabilitate our already degraded environs.

The study that we will hear about today provides a basis for amending the Clean Water Act in order to take into account the unique situation of our coastal cities.

Communities like San Diego must be given the flexibility to address legitimate environmental problems in a fiscally sound manner. So, I am pleased to be part of this hearing. I am looking forward to the testimony, seeing my former colleagues and witnesses for which we have worked toward this for several years now.

Again, thank you, Mr. Chairman, for giving our citizens here the opportunity to influence the legislative process.

[The prepared statement of Bob Filner can be found at the end of the hearing.]

Mr. STUDDS. Thank you, Bob. I am really pleased to be flanked by three San Diegan members. You can imagine if the other two were here, you would be overwhelmed with distinction.

[Laughter.]

Mr. STUDDS. So, one of the unaccountable things about the California delegation—and there are many—is their numbers. I want to point out at this point that there is a larger percentage of the Massachusetts delegation before you than of the California delegation. So there.

[Laughter.]

Mr. STUDDS. And there would be even if all five of you were here. Now, we go to people who I am sure are just as distinguished.

Forgive me for one more observation. We have brought one of Washington's many barbaric habits with us, and that is those three lights. With as many witnesses as we have, we have to do this in order to get through the hearing and allow all witnesses an opportunity to make their statements and members to ask their questions.

I would ask everybody from this point on—and believe it or not, this applies to Members of Congress as well—to confine their oral testimony to no more than five minutes. I can see we have some written testimony of great length, and it will appear in its entirety in the record. Future historians will never know that every word of it was not actually spoken.

We will ask our witnesses to confine themselves to five minutes of oral presentation and members to five minutes of questioning. When the yellow light goes on, it means that you have one minute left. When the red light goes on, it means you have completed your testimony.

We apologize for the barbarity, but as I said, we brought that with us. It is not your fault.

I am delighted to welcome the Mayor of the City, Susan Golding. Mayor Golding, thank you very much for having us.

Your Honor?

STATEMENT OF SUSAN GOLDING, MAYOR, CITY OF SAN DIEGO; ACCOMPANIED BY VALERIE STALLINGS, COUNCIL MEMBER, CITY OF SAN DIEGO

STATEMENT OF SUSAN GOLDING, MAYOR OF SAN DIEGO

Mayor GOLDING. Thank you, Mr. Chairman.

I want you to know that having lived in Boston and New York for a number of years before I came here, when I saw the sign that said "ocean" I always turned east. It took a number of years before that habit stopped.

I appreciate the fact that you were willing also to come to San Diego, to the very distinguished Chairman, members of the Committee, and members of our City's congressional delegation.

We are privileged to welcome you to San Diego and to thank you for taking this time. This issue is of critical importance to this community. My purpose in appearing before you today is to request your help in allowing San Diego to meet the Clean Water Act re-

quirements in a sensible and environmentally protective way, and a cost-effective manner.

The existing Clean Water Act, which we have strongly supported, does not allow the City and Federal District Court to take the steps necessary to fully protect our ocean with a program as you indicated earlier in a way that makes the best use of ratepayer dollars.

Existing Clean Water requirements for San Diego's ocean outfall does ignore sound science when it relates to our outfall, ignores regional differences between marine environments, and also tends to ignore new and improved technology for treating sewage.

Our ratepayers should not be forced to spend literally billions of dollars on a project that will provide no greater appreciable environmental benefit. This country's resources are too scarce, especially this day. There are too many other serious environmental problems that also must be addressed.

The existing Clean Water Act requires construction of a waste water treatment program that will cost San Diego ratepayers \$2.3 billion. We seek an option to develop a waste water treatment program that has the same environmental impact, but at the cost of approximately half—\$1.3 billion. That \$1 billion difference is the cost of complying with full secondary treatment.

San Diego's coastal marine environment at the Point Loma outfall does not require a full secondary treatment. Science and geography, I think you will see, are, in fact, on our side. There may be areas in San Diego County which do require it.

I have supported secondary treatment in the past in the county where the outfalls are shorter and where new waste water treatment facilities may not adequately protect our ocean, but full secondary treatment makes no sense at the Point Loma outfall.

San Diego has an ocean floor that slopes steeply away from the shoreline, accessing deep marine waters within only a few miles off our shore. We have an open coast that is part of the vast expanse of the Pacific Ocean. We have swift currents, and a dynamic mixing of waters off Point Loma.

We are, at the present time, as Congressman Filner knows full well, extending that outfall even further—4.5 miles—and into deeper waters, 320 feet below the surface that will be unique when it is finished, which will be soon.

With this new outfall, there is no difference in the environmental impact between secondary treatment effluent and San Diego's present advanced primary treatment effluent. When I say secondary, I mean full secondary. San Diego has monitored the effects of the existing discharge on the marine environment for 30 years and found that there is no real significant impact.

In the EPA's Federal Court lawsuit against the City in 1991, Federal Judge Rudi Brewster considered a significant amount of evidence presented by the best scientists in the country and found that there is no significant impact.

The National Research Council's report, commissioned by your Congress, clearly shows that we can balance protecting our precious ocean environment with the needs of San Diego's sewage system by setting water and sediment criteria and standards.

More importantly, it confirms what we have been saying for years in San Diego. Advanced primary treatment is appropriate for San Diego's deep ocean environment at the Point Loma outfall.

This report provides a clear scientific foundation for Congress to protect the coastal marine environment by amending the Clean Water Act to reflect regional science and geography.

Secondary treatment is even more of a burden when we realized that San Diego has received less than one percent of the multi-billion costs of Clean Water programs from EPA grants, or revolving loan funds from the State. We are left with our ratepayers paying 99 percent of the system.

Previously the Act provided funding for 75 percent of those secondary improvements. The State of California provided a matching amount. The remainder was eligible for State loans. That is no longer true.

Unlike Boston, our solution is not just Federal funding assistance, but it is an amendment of the Clean Water Act to allow San Diego to continue a waste water management program that does, and will, meet California ocean plan requirements.

This is a specific example of a way for Congress to immediately reduce the costs of the Clean Water Act, compliance without sacrificing any water quality goals. Our ocean is one of our most valuable resources. San Diego is a very environmentally conscious community. We intend to protect our water and ocean climate. We must protect it. We are protecting it now.

We are asking you to allow the San Diego ratepayers to save at least \$1 billion with no reduction in the protection to the environment by reauthorizing the Clean Water Act to allow for this special circumstance.

Thank you very much, Mr. Chairman.

[The prepared statement of Ms. Golding can be found at the end of the hearing.]

Mr. STUDDS. Thank you, very much, Mayor. I appreciate it. Your very extensive testimony will appear in its entirety.

Next is City Council member, Valerie Stallings. Welcome.

STATEMENT OF VALERIE STALLINGS, COUNCIL MEMBER, SAN DIEGO

Ms. STALLINGS. Thank you, Mr. Chairman, and members of this Subcommittee. I am Valerie Stallings, San Diego City Council member from the Sixth District.

Prior to my being elected to office, I was a researcher at the Salk Institute for over 20 years. As a member of the San Diego City Council, I am responsible for working with my colleagues and with yours to ensure that our City has a sewage treatment system that protects the environment and protects our ratepayers' pocketbooks.

Today I will testify about two things—the science, with my scientific hat on, and with my Council member hat on, the costs.

When the Act was drafted in 1972, there were significant water problems in many areas of the country. They needed to be addressed quickly. So, a technology-based system, secondary treatment, was included as a black-and-white standard—one that would be easy to enforce—and Federal and State construction grants to

the tune of up to 90 percent of the cost of the project were included as an incentive.

But that was over 20 years ago, about the time that I started at the Salk Institute. Just as there has been dramatic progress in the world of medicine and research at Salk, there has also been dramatic progress in environmental, engineering, and marine science that can, if we choose to use it, benefit coastal communities.

First, ocean outfalls. The extension of San Diego's outfall that is currently under construction will provide 300-to-1 dilution, making it one of the most effective outfalls in the world.

In addition, San Diego has under design an undersea outfall tunnel, a first for the West Coast, and only the second in the country, following in the footsteps of your Boston Harbor tunnel, Mr. Chairman.

Mr. STUDDS. Please don't refer to it as mine.

[Laughter.]

Ms. STALLINGS. You are not there digging it yourself?

Second, let me address treatment process. Our treatment plant, which was considered state-of-the-art when it went into operation in 1963, has continually been improved by using chemical enhancement to remove 75 to 80 percent of suspended solids.

Removal of suspended solids is important to ensure that toxics—pesticides, and heavy metals, for example—stay out of the ocean. At our treatment plant, our advanced primary process meets all secondary treatment criteria for toxics.

Third, source control. This is where we see the greatest improvement in waste water quality. San Diego's theme for sewage treatment is that the treatment plant, ironically, shouldn't be the place we rely on for ensuring protection of the ocean.

We don't want to depend on the treatment plant to remove the toxics. We don't want them to get into the system in the first place. It is a tribute to the effectiveness of San Diego's industrial pretreatment program that today 100 percent of our sludge can be beneficially reused. That is because we have such a high-quality sludge.

[Laughter.]

Ms. STALLINGS. I don't think I will comment on that any further.

Mr. STUDDS. Pure poetry.

Ms. STALLINGS. In addition to the advances in engineering, we have three decades of ocean monitoring data in hand. This kind of information—some of which you will hear about later—is the envy of the scientific world because it is very unusual to have so much long-term data.

As a result, we have all the facts any scientist needs to demonstrate that the existing discharge is protecting our ocean.

Finally, costs. Our ratepayers in San Diego have been patient. They have supported improvements to the sewage system with their pocketbooks. They have paid \$100 million to build an interceptor ring around Mission Bay to protect it from sewage spills—\$60 million to extend the outfall to protect divers in the kelp bed. They are paying \$200 million for a new water reclamation plant to supplement the potable water supply, and over \$300 million for a new sludge processing facility.

These things add up, but they are worth it. On the other hand, secondary treatment at the cost of \$1 billion in capital and another \$1.7 billion in financing, isn't.

I understand the fears of opening up Pandora's box. Indeed, we do need to be careful, but we mustn't be afraid of change when change means progress.

Thank you.

[The prepared statement of Ms. Stallings can be found at the end of the hearing.]

Mr. STUDDS. Thank you very much, Ms. Stallings.

That is very clear testimony. It is not easy to verge on the poetic on this subject, but you did.

I am not going to take time from the other members for questions. Let me just make one observation. As you probably know, I have legislation that is an outgrowth of several years of hearings, study, and thought, which is an attempt to try to find some alternative way of funding Federal Clean Water mandates.

It involves, generally, a polluter-pay kind of a principle. We are attempting to raise an extra \$4 billion a year. We suggest, at least for initial conversational purposes, fees on those who discharge toxics into the water and fees on those who manufacture pesticides and fertilizers, because, after all, they are a primary source of the toxics that come from groundwater run-off.

Without committing ourselves to a particular source of funding, the fact of the matter is that we are going to have to find innovative alternative sources given the budgetary situation in Washington, or we aren't going to find dramatically increased Federal funding available. I think that is one of the facts of life for the moment.

I don't know if you have seen that or thought about that. But if you have, I would be interested to know whether you think, generally speaking, it is a sound idea. If so, we need your help nationally, in terms of rallying support for the concept.

Mayor GOLDING. I am generally familiar with your proposal, Mr. Chairman. I believe very strongly that those who pollute must clean up their pollution.

In San Diego we do have a pre-treatment program which is a little bit different than applying the tax. So, actually by the time the water gets to us, has been pre-treated. We have been requiring our industrial polluters to do that in San Diego for a period of time.

I would have to examine what the additional tax would be on that program, but in general I do think that those who pollute must be required to clean up or to pay for the pollution that they cause.

Mr. STUDDS. We don't need it so much as a punitive measure, although obviously it is an incentive to reduce one's emissions, but as an alternative source, simply a revenue to help fund the Federal mandate.

Ms. STALLINGS. Since run-off and fertilizer problem is a major source of contamination for San Diego, I have only recently been exposed to your legislation. I am interested in pursuing the ramifications of how it would affect our run-off.

Mr. STUDDS. Sure. There is no source of funding that does not immediately arouse someone's anger as well as interest, as you might

imagine. Within days of introducing this, I was attacked by my own landscaping industry, who didn't like the idea. So the challenge is to find something. There is nothing that everybody likes.

As I say, imagine it yourself. I think the Greater Boston area is probably more or less similar in population to the Greater San Diego area. We are being asked, through homeowners, to fund a \$6 billion project. I understand where you are coming from.

Ms. Schenk.

Ms. SCHENK. Thank you, Mr. Chairman.

I am very familiar with the position of the City and support it. I have no questions for this panel. I would suggest moving along.

Mr. STUDDS. Mr. Cunningham?

Mr. CUNNINGHAM. Thank you, Mr. Chairman.

I am also familiar, but I would like to just state it for the record because I know the answer. I would like to have the Mayor respond.

I know back in 1987 the EPA promised San Diego that it would be forthcoming in funds. We then met with EPA Administrator Reilly last year on receiving those funds. But can you state for the panel the status of those funds from the EPA that San Diego was promised?

Mayor GOLDING. Yes, Congressman Cunningham, I would be happy to.

I think I alluded to it in my testimony. Briefly, I think we should have a chart up here that will help you in understanding.

As I mentioned, our local ratepayers are going to be paying for 99 percent of any secondary treatment, or any other kind, that we have in San Diego. The funding has not come through at the level that was originally promised.

The 75 to 90 percent funding under the original Construction Grants Program that made the Clean Water Act such a success in those cities who received it, it doesn't exist for San Diego. I think that is what the Chairman was referring to.

The Coastal Cities Grants have been a great help. Over the past two years they was a \$85.5 million set-aside for projects. We could have used it. Obviously we could use more for that. That has been appreciated.

But I will only say in summary to your question, the simple answer for San Diego is this small change, based on sound science, would not cost anything.

Mr. CUNNINGHAM. Thank you.

Mr. STUDDS. Mr. Filner.

Mr. FILNER. Thank you, Mr. Chairman.

As you well know, there is a scientific, a legislative, and a political dimension to the issues that we face. As you also know, I completely agreed with your testimony, personally.

At the Congressional level we are going to need some help in the legislative and the political realm, I think.

For example, has the City come to a specific recommendation for the legislative change that you favor? Did I miss that you had a specific recommendation? You were talking about flexibility. As you know, I agree with that. You were talking about a different way of measuring the standards.

I think we want to be clear that we are not asking for waivers from the Clean Water Act. We are not asking to get around the Clean Water Act. We are not asking to have environmental degradation. We are asking for flexibility.

But we have been trying for several years in the City to come up with a specific legislative language. We, in Congress, are obviously working on that. But have you had any recommendation for us on that?

Ms. STALLINGS. Let me answer that, perhaps not to the detail that you might want, Mr. Filner. Mr. Bayer has something for us, actually.

Mr. FILNER. His language says we have to put an airport there. [Laughter.]

Ms. STALLINGS. The thing that I want to say quite clearly and as succinctly as possibly is that the city of San Diego is not seeking a waiver.

For the last year and a half I have carried that as my own personal crusade. Mr. Cunningham will remember that when I first went to Washington to help lobby on this matter, I was trying very hard to make the point that the City is not seeking a waiver. Waiver always implies trying to get out of something. That is not what we are trying to do.

We are not seeking a waiver, but rather seek to have the Clean Water Act revised—not fundamentally—but in recognition of the new science and the regional needs. Mr. Filner, we have sent back to our lobbyists in Washington and to you different kinds of wordage which would enable us to be able to do that. Whether you want to go into the specific language at this point or not, I'm not sure. We have some samples of that in our efforts.

Mayor GOLDING. Maybe I can help here. What we are asking for is a standard that is based not on treatment, but at attainment of water quality.

What we are suggesting is that treatment requirements are established by the Administration. Our wording—and again we are open to any conversation on this—to an integrated process on the basis of regional receiving water and sediment quality criteria, or chemically enhanced primary treatment, that removes, at a minimum, 75 percent of suspended solids and discharges into the ocean at a minimum of 300 feet beneath the surface of the receiving water.

That would maintain the quality that is the aim of the Clean Water Act. It would also clearly allow the Point Loma Outfall in San Diego to continue its treatment, which has no negative impact on the environment—no more than secondary.

Thank you, Mr. Filner.

Mr. FILNER. Does that suggestion have the support of not only the political body, but the local environmental community?

Mayor GOLDING. This is the language that we have been working on. You will hear testimony from members of the environmental community. I think you will see that there is some split among even environmentalists.

Mr. FILNER. I would urge the City to make sure that a position is arrived at through a process that is very inclusive, that has widespread support in the environmental and the political community.

We, as Congresspeople and your representatives, face a tremendous difficulty in amending the Clean Water Act. We need to make sure that the political environment is suitable by making sure that all the local players are involved in that final recommendation to us.

Thank you.

Mr. STUDDS. Thank you.

Mr. Cunningham.

Mr. CUNNINGHAM. Thank you, Mr. Chairman.

I would like to amplify on Mr. Filner's statement. As I understand it—and correct me if I am wrong—over the history that most of the oceanographic institutions, along with the Academy of Sciences, support this position.

There will be some environmental groups, I think, that will testify today. I would like to hear from the environmental groups on what changes they would make to our position to make it compatible, and also to comply and make it easier with what Mr. Filner was talking about: What do we have to do to make all those groups happy so that we can solve our problem?

Thank you.

Mr. STUDDS. Thank you. If we can make everybody happy, we will have had a very good day.

Mayor GOLDING. If you find out how to do that, I would like to know.

Mr. STUDDS. Thank you. If we find out, we will share it with you immediately.

[Laughter.]

Mr. STUDDS. I want to thank you, Mayor Golding, and Councilwoman Stallings very, very much, and generally speaking, for the hospitality for your City. Thank you all.

We go next to our second of three panels. I believe there are four members of this panel. If you would all take your place at the table, we would appreciate it.

We welcome the second panel. I guess you were all here, so you are familiar with the lights. Again, we apologize for them. It is not the most polite and humane way to proceed.

We are going to take you as a panel in the order in which you appear on the witness list, if that is OK with you. I will ask each of you to complete your oral testimony. Then we will open up for questions.

We will begin with Mr. Robert Simmons, speaking for the Sierra Club. Mr. Simmons, welcome.

**STATEMENT OF ROBERT SIMMONS, ATTORNEY, SIERRA CLUB;
ACCOMPANIED BY: ELMER KEEN, CITIZENS COORDINATE FOR
CENTURY 3; DR. SCOTT JENKINS, ENVIRONMENTAL DIRECTOR,
SURFRIDER FOUNDATION; ASSOCIATE ENGINEER, SCRIPPS IN-
STITUTE OF OCEANOGRAPHY, CENTER FOR COASTAL STUDIES,
AND LISA WEIL, POLICY DIRECTOR, AMERICAN OCEANS CAM-
PAIGN**

STATEMENT OF ROBERT SIMMONS, ATTORNEY, SIERRA CLUB

Mr. SIMMONS. Mr. Chairman, would you give me verbal when the yellow and red lights come on. Thank you very much.

Mr. STUDDS. I will. I understand.

Mr. SIMMONS. Mr. Chairman and members, I am Robert Simmons, Professor of Law at the University of San Diego, and counsel for the Sierra Club in four year running Federal litigation.

Stripping away the fog, what the City wants from you is an amendment to the Clean Water Act that permits it to continue polluting. In effect, it is asking you for an exemption from the treatment standards that will legalize its practice of discharging 25 percent of all of its sewage pollutions into the coastal waters.

The Sierra Club is opposed to that for three reasons. One, the City is a chronic scofflaw. After a lengthy trial in 1991, our Federal Court found the City guilty of continuous knowing violations of the Act since 1983. It still is in violation, and recently it declared its intention to continue those violations indefinitely.

In 1989, the City entered into a consent decree settlement with EPA and the State in which the City promised that it would upgrade its treatment standards to full compliance with the Act.

Yet, last year it did an about-face and repudiated that promise. It seems to us especially inappropriate for you to reward the City for this "to Hell with the law and our promise is policy" when today over 90 percent of all cities on both coasts have fully complied with the Act.

The second reason we are opposed to it is because it is clearly unsafe, and because it makes it impossible for us to ever achieve what the Federal courts have said is the primary goal of the Act, namely a steady decrease in pollutant loads into coastal waters.

If you legalize this, as they want, "Well, this 25 percent discharge of pollutants into coastal water—don't you see the inevitable result will be a steady increase in the pollution loads as population growth continues?"

They will say to you—and Dr. Tegner is going to testify—and she will say to you, "Well, it is all right because the effluent does not injure the marine environment."

Mayor Golding told you that the Federal Judge found the same thing. Well, unhappily, the Mayor did not read the Judge's decision.

After a lengthy trial in 1991, Dr. Tegner and others from the City expressed the same opinion, "It doesn't hurt anything." Those opinions were opposed by EPA and other scientists. After the trial, the Judge declared just the opposite. He found that the 25 percent effluent discharges did, in fact, injure our marine environment.

Besides that, he found they constituted a health threat. I have that decision here and would ask that you enter it into the record at the conclusion of my remarks.

In addition to that, what has happened since to compound the health threat difficulty that the Judge found is this. Mr. Chairman and members, the City doesn't disinfect its sewage at the plant. It has no intention to disinfect in the future.

Scientific experts testified about what that means. It means that every disease, water-borne pathogen going into the toilet comes into the plant at the front end.

If the City is allowed to continue removing just 75 percent of the solids, to which the experts testified those pathogens cling, that

means that 25 percent of all of the pathogens will go out through the outfall into the coastal waters.

Compounding it is that since the Judge's decision, we are now taking 14 million gallons of Mexican raw sewage daily into the plant with their highly elevated toxin burdens without disinfection.

In addition to that, there is going to be testimony that, "Well, we're going to extend the outfall. Therefore, we are going to carry the effluent and discharge it out into deeper water."

But they won't tell you that that doesn't protect us from near-shore outfall ruptures and chronic leaks that has occurred over time. Last year, in February, we had a massive rupture near the shore spewing 170 million gallons a day of partially treated sewage near our shore for weeks.

Mr. STUDDS. Mr. Simmons, this is your verbal cue. The one minute warning just went.

Mr. SIMMONS. All right. Thank you.

Our third reason for opposing the exemption is that this amendment is not needed, Mr. Chairman. The City wants the exemption because it wants to retain the Point Loma plant where it is, and will avoid spending in excess of a billion dollars in new facilities.

The Sierra Club wants the same thing. This is a common goal. We can achieve that goal without weakening the Clean Water Act. In 1991, we tested before the court expert witnesses that a new cheaper treatment process—an enhanced chemical—can work at the plant, can achieve the treatment standards under current law at a fraction of the cost.

The Judge agreed, ordered the City to test the process. That test has gone on for over a year. It is nearing completion. We expect a report in August.

Sierra's expert has followed along and worked on test. We are convinced that if the City would use this enhanced chemical method, they can fully comply with the law, cheaply.

Finally, in conclusion, San Diego metro's public, Mr. Chairman and members, doesn't need you to tell your colleagues to amend the Clean Water Act. What it does need is for you to tell the City to clean up its act.

If it would just stop its reliance on Congress to bail it out from the problems it has caused, and cooperate with the EPA, the State, and the Sierra Club, we can solve our own problems—cheaply, safely, and quickly.

Thank you.

[The prepared statement and attachment of Mr. Simmons can be found at the end of the hearing.]

Mr. STUDDS. Thank you very much, sir.

You can remain at the table, Mr. Simmons. There will be questions for everybody. You never know.

Next, Mr. Elmer Keen, speaking for Citizens Coordinate for Century Three. Mr. Keen.

STATEMENT OF ELMER KEEN, CITIZENS COORDINATE FOR CENTURY 3

Mr. KEEN. Thank you, Mr. Chairman.

My name is Elmer Keen. I chair the Water Committee of Citizens Coordinate for Century 3, a local organization devoted to sound regional planning, and to which, incidentally, Roger Revelle belonged for many years.

Based on findings in my written statement, I suggest that the Clean Water Act be revised in three ways: One, specify that treatment of municipal sewage in coastal areas be at the lowest level consistent with avoidance of adverse impacts on marine ecosystems.

To do so will avoid numerous significant adverse impacts to atmospheric and terrestrial resources, such as those described in environmental impact studies for secondary treatment facilities planned for San Diego.

Two, require establishment of Integrated Coastal Management systems as outlined in the National Research Council study, "Managing Wastewater in Coastal Urban Areas."

To implement these systems, require investments in them at least equivalent to the difference in investments needed to meet recommendation one above, and investments that would be needed for secondary treatment of the areas's sewage.

In San Diego and many other coastal areas, this will divert resources from environmentally damaging to environmentally enhancing projects.

Three, require that environmental impact statements assess impacts in a cross-media framework in certification of statements. This will reduce chances of "hidden agenda" frustrating the intent of Congress, as do the final wording of Section 301(h) of the Clean Water Act, and the regulations written for its implementation.

The hidden agenda referred to is a well-intentioned but misguided effort to support water reclamation and nutrient recovery from municipal sewage. Again, I refer you to pages 24 to 36 of my written statement.

Secondary treatment provides a major subsidy to recovery of these two resources. For example, the cost of use of reclaimed water from the plant approved recently for San Diego is estimated to be \$1,400 per acre foot, if reclamation has to bear the cost of secondary treatment, but only \$960 per acre foot with secondary treatment cost written off to the ocean. Potable water delivered to the tap in San Diego currently costs \$535 per acre foot.

We fully support recovery of resources from all waste streams when doing so makes sense. We cannot, however, support subsidy of resource recovery by requiring secondary treatment that entails irrational environmental and environmental costs such as those faced by San Diego.

Again, I thank you sincerely for the opportunity to appear before you.

[The prepared statement of Mr. Keen can be found at the end of the hearing.]

Mr. STUDDS. Thank you, Mr. Keen. That is a masterful example of summarizing a 55-page statement. You are a model for us all.

Mr. KEEN. I thought I had three minutes instead of five. I could use five.

[Laughter.]

Mr. STUDDS. Thank you. Sorry about that. You can have a lengthy answer. I appreciate that.

Next, Dr. Scott Jenkins of Scripps. Dr. Jenkins.

**STATEMENT OF SCOTT JENKINS, ENVIRONMENTAL DIRECTOR,
SURFRIDER FOUNDATION, ASSOCIATE ENGINEER, SCRIPPS IN-
STITUTE OF OCEANOGRAPHY**

Mr. JENKINS. Thank you, Mr. Chairman.

My name is Dr. Scott Jenkins. Although I have been a researcher at Scripps Institution of Oceanography in Coastal Processes since 1980, I am actually going to talk to you as the Environmental Director of the Surfrider Foundation, which is 25,000 kids in 11 coastal States.

These kids are the so-called canaries in a coal mine—what was once referred to by the previous EPA Director as their favorite indicator species for the effectiveness of the Clean Water Act.

[Laughter.]

Mr. JENKINS. Now, one of the disturbing things that comes across our phones at Surfrider are hundreds and hundreds of incident reports of illness. Just because scientists can tell you there is no data about human impact, oftentimes they mean literally that. There is no data, period.

The fact is there has not been an epidemiology study on bathing water and illness since Victor Cabelle's 1972 study. That was only for one pathogen, enterococcus. Now, we have some very strange illnesses coming up among our surfers—viruses like the Coxsackie B, and in Hawaii, a spiralchete called leptospirosis.

These are very serious illnesses. We do not test for them. We test indicator species. So, my first request is that the Congress fund epidemiology studies to see what are the human health impacts of pathogens at defined levels in bathing water.

Now, among the existing data we do have for these indicator species there is really not an obvious connection between treatment levels at plants and illnesses and polluting bathing water in the surfzone.

I want you to understand that most of the testing done in this country is in the neighborhood of the offshore outfalls often many miles offshore. People are not swimming out there. They are swimming very near the shoreline. In this area, it appears the primary source of the high bacterial levels is, in fact, the run-off from storm drains and from raw sewage from leaking sewer infrastructure.

Now, what San Diego truly needs before we need secondary treatment is we simply need to get the sewage to the plant in the first place. We have many, many raw sewer overflows in this City. They often find their way into the storm drains and leave a layer of sludge in the bottom of the storm drains that continues to recontaminate ordinary run-off.

Now, the Integrated Coastal Management approach that has been posed by the Natural Research Council does make sense for San Diego. Perhaps you ought to consider an ocean outfall standard that is based on conditions such as the mixed-layer depth and the coastal circulation.

But just because that helps San Diego doesn't mean that is a good fix everywhere because secondary treatment, for example, at Mamala Bay in Hawaii is what they do, in fact, need to have a distinctly different coastal environment.

So there should, in fact, be flexibility in the Clean Water Act to adapt for this varying environmental constraint on the requirements of ocean outfalls, and at the same time allow cities to dedicate resources to the areas that will have the first and most immediate impact.

But that does not mean that in the long range we ought to totally abandon the ideal of secondary treatment because, in fact, our cities will continue to grow long after these issues have been visited at this time.

Now I would like to move on to a couple of other concerns, and that is that until the structural remedies that will provide additional capacity in our systems that we may perhaps handle storm drain run-off or provide it.

Our only hope is in source control. The best management practices—the BMPs—of Section 319 are presently not working. They are not working because they rely on voluntary compliance and because the local agencies simply have no standard with which to define NPDES permit levels for storm drains.

So, the Congress needs to do some research here as well in terms of finding out what the spectrum of pollutants are commonly in storm drain run-offs, that there is a basis for standards on these NPDES storm drain permits.

Now, with regard to the NPDES permits on non-points for discharges. You know, there is more than just sewer plants out discharging. We also have refineries, for example. Self-monitoring—the present system we have for compliance with NPDES permits is truly a joke. It is like checking your own homework.

This allows the discharger to arrange the sampling schedule for times when his discharges are often minimal. When you have remote monitoring by a dispassionate third party, you often find totally different levels. So, I think Section 403, which allows for this cascade of deferring enforcement to local levels, where there are often conflicts of interest, also needs to be addressed.

Finally, I would like to say that since these non-point sources apparently are our number one bathing water quality problem, we need to preserve our wetlands because they are, in fact, nature's natural treatment system for natural run-off. Congress ought to also consider funding wetlands restoration as a remedial measure for this problem of non-source point pollution.

Thank you.

[The prepared statement of Mr. Jenkins can be found at the end of the hearing.]

Mr. STUDDS. Thank you, sir. I must say the concept of 2,000 surfers is one that we have not taken into account in Boston. It is rather awesome.

[Laughter.]

Mr. STUDDS. Ms. Lisa Weil, the American Oceans Campaign. Ms. Weil.

STATEMENT OF LISA WEIL, POLICY DIRECTOR, AMERICAN OCEANS CAMPAIGN

Ms. WEIL. Thank you. Good morning. My name is Lisa Weil. I am the Policy Director for American Oceans Campaign with offices in Santa Monica and Washington, DC. AOC is dedicated to conserving and enhancing our Nation's oceans and coastal resources. I would like to thank Chairman Studds and the members of the Committee for inviting us to testify today on this very important issue.

Since the original Clean Water Act was signed into law, its provisions have been revised on numerous occasions. With each reauthorization Congress has strengthened protections for our coasts from pollution.

As the 103rd Congress is faced with this same daunting task, we believe that the critical state of our Nation's aquatic ecosystems and our global environmental demand passage of even greater protections.

Clearly the public sees the potentially disastrous short and long-term environmental, social, and economic costs associated with delaying the implementation of environmental protections.

They realize that it is more costly to deal with environmental problems with a band-aid approach than it is to address them through a comprehensive and strategic planning process aimed at cleaning up and preventing pollution.

Therefore, as you reauthorize the Clean Water Act, we encourage you to move ahead with confidence that the public solidly supports strong and enforceable legislation.

California's population has rapidly increased to 28 million people over the past few years. Of this number, 67 percent live in the coastal counties, and 80 percent live within a hour's drive of the Coast.

Our precious California coastline is also an incredible attraction for tourists from all the world. In 1992, there were over 60 million visitors to Los Angeles County beaches, and there were over 17 million visitors to San Diego beaches.

Although progress has been made, substantial pollution still exists along the entire Coast of California from a variety of sources including sewage and industrial waste water discharges, urban run-off, agricultural run-off, and contaminants in storm drains.

The greatest coastal pollution incident in 1992 occurred right here in San Diego when a break on the Point Loma sewage line spewed over 180 million gallons a day into the ocean and closed down the beaches for over two months. And in 1991, San Diego County reported 51 percent of all of California's beach closings and advisories.

San Diego's Point Loma waste water treatment facility provides advanced primary treatment for sewage water from the Greater San Diego metropolitan area. When it operates optimally, the Point Loma plant does not meet the Act's requirements for suspended solids, or BODs.

Its discharge, contaminated with pathogens, harms the Point Loma kelp beds and puts divers and others at risk of immediate illness. Without improved treatment of its waste water, San Diego

cannot meet the Water Quality Standards maintained by the Act and the California Ocean Plan.

Our support for improved treatment of waste water is formed by our direct experiences with the L.A. County Plant. That facilities discharges 130 million gallons per day into the near-shore ocean environment. The area near L.A. County's outfalls is heavily impacted, experiencing reduced growth, high mortality rates, and reproductive harm to aquatic life.

By L.A. County's own estimates, current advanced primary treatment at the plant dumps substantially more pollutants than full secondary treatment would. Advanced primary treatment used by L.A. County and San Diego requires the heavy use of chlorine, which combines with ammonia and nitrogen rich effluent to form highly toxic compounds.

Full secondary treatment may not be the right technology for every one. When Section 301(h) was added to the Clean Water Act, the intent was that each situation would be individually addressed and analyzed.

If certain requirements were met, especially that the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality, which assures protection of public water supplies and the protection of propagation of a balanced indigenous population, the Administrator, with the concurrence of the State, may issue a permit to modify the requirements.

In Orange County, after extensive research and analysis, a 301(h) waiver was granted to the Sanitation District. The Orange County Sanitation District will probably get a second waiver from EPA by the end of the year.

EPA denied waivers to San Diego and L.A. County because it specifically determined that the requirements were not met to justify a waiver from going to full secondary treatment, and complying with the law, as specified in the Clean Water Act.

The plants were not meeting the requirements of the State Ocean Plan, and/or failed to demonstrate that a balanced indigenous population existed outside the zone of initial dilution.

What does full secondary treatment get you? Full secondary treatment is very effective at degrading many carcinogenic organics, including the chlorinated phenols and the PAHs.

Also, full secondary improves solids and pathogen removal efficiencies so the effluent has less toxics and less microbes that can cause people to get sick.

We are very pleased that the National Research Council report advocates the approach of Integrated Coastal Management. AOC supports the need for pollution prevention, conservation, waste water reclamation, and better identification of pathogens through research and testing.

It must be expressly pointed out that this position takes no position on exemptions for any particular municipality. We concur that none is justified.

The mandates of the Clean Water act must be complied with and hopefully strengthened in the reauthorization process. Any unjustified deviation from compliance with the law, specifically from

being exempted from going to secondary treatment, must not be tolerated.

This would have the effect of undermining the very purpose of the Act. The EPA has specifically determined that the discharge at issue harms biological resources, and impairs recreational use. Therefore, it would be inappropriate to approve any waiver or exempt San Diego from compliance with the Clean Water Act.

Thank you for soliciting our views on this issue. We appreciate the Committee's attention to the problem of coastal pollution, and look forward to working with you to assure that the Clean Water Act is strengthened during the reauthorization.

Thank you.

[The prepared statement of Ms. Weil can be found at the end of the hearing.]

Mr. STUDDS. Thank you very much, Ms. Weil.

Ms. Schenk.

Ms. SCHENK. Thank you, Mr. Chairman.

I have a question for Mr. Simmons. Mr. Simmons, of course you heard the testimony of the Mayor and Councilwoman Stallings.

You are very familiar with the position of the City. You also heard my colleague, Congressman Filner's point that this is an issue that has many aspects to it, many shadings to it. Of course, the environmental perspective is perhaps paramount in this.

Let me ask you, going back to our law school days, to assume a hypothetical. Assume for the moment, Professor Simmons, that the chemical process that you described doesn't work.

First, I would like to ask you if it doesn't, then what? What would be the position of the Sierra Club and the environmental community?

Mr. SIMMONS. Ms. Schenk, forgive me for opening up my answer by saying that is a little like a hypothetical that we judge unworthy of law school to what if the sun is not the center of the solar system?

This is not a frivolous answer. Our expert, Mr. Spirling, has worked continuously with the test of enhanced chemical process for over a year and a half now. He has done there repeatedly. He knows the test results. He has worked with this same process at Takoma which does achieve full compliance.

He is convinced, and our other information leads us to be equally convinced that it will work. It will achieve compliance far earlier than the 2003 date under the consent decree for a trifling additional treatment cost and allow the City to allow a goal that we share—namely, keep the Point Loma treatment plant where it is and don't spend more than a billion dollars on new facilities.

It is a matter of cooperation. If the City will join us, and EPA, and the State, we are going to a common goal. We can achieve it if the City will simply meet us fairly in cooperation.

That test program will end, Ms. Schenk, in another month or so. We anticipate a final report in late August or early September. We are convinced that it will comply.

It has to be combined with water conservation, but as you know, we have got the best mandatory water conservation ordinance anywhere in the United States, that is rapidly dropping the sewage volumes that need to be treated.

The combination of that aggressive water conservation, and a reasonable program of water reclamation we use, combined with enhanced chemical process, will comply with present law. It does not need to be weakened.

Ms. SCHENK. Professor, with all due respect, we don't have the results yet. There are others who have a slightly different point of view who also have been following these chemical processes. Obviously, we will wait and see what the result is.

But since we are here today before the report is completed, let me ask you. Putting aside chemical enhancement for the moment, with the hypothetical that perhaps it might not work, particularly in conjunction with the very expensive reclamation program that we have discussed before, is there any circumstance under which you would see a modification to the Clean Water Act to allow for some of the options that Mayor Golding and Councilwoman Stallings testified to?

Mr. SIMMONS. No, I don't see the need to modify it except insofar as 301(h) is concerned. As the previous speaker, Ms. Weil pointed out, Ms. Schenk, Section 301(h) allows for unique situations such as San Diego finds.

The Sierra Club could easily join with the other parties in the litigation and support a waiver application under current law.

We could argue, I think very persuasively, that the effect of giving San Diego waiver, if it would use an enhanced chemical, and treat up to the maximum that is feasible, combined with the water reclamation reuse diversion from the plant, the total effect of that would be to reduce the mass load of pollutants going into the ocean.

That would achieve the goal of the Act, and, I think, would be an irresistible argument in support of the waiver process.

Ms. SCHENK. Thank you, Mr. Chairman.

I see my time is running out. I have no further questions for this panel.

Mr. STUDDS. Mr. Cunningham.

Mr. CUNNINGHAM. Thank you, Mr. Chairman.

First of all, Chairman Studds and I continually work toward making Duke Cunningham an extremist environmentalist, Mr. Simmons.

Mr. STUDDS. It's a painful process.

[Laughter.]

Mr. CUNNINGHAM. Yes, it is. It is a painful process.

Ms. SCHENK. And an impossible one.

Mr. CUNNINGHAM. Not impossible.

I would like to thank several environmental groups, including the Sierra Club, for working with us in NAS Mermer with Fish and Wildlife. One of the plans we discussed, even yesterday, was to take all of the military bases in the State of California—and I would hope it would expand out to the United States—to make those not only as environmental sanctuaries, but to comply with Clean Water and EPA requests.

I have a bill out that limits all offshore oil drilling on existing leases. I would like to get your support on that as well.

Mr. SIMMONS. You have it, Mr. Cunningham.

Mr. CUNNINGHAM. Thank you, Mr. Simmons.

I would like to thank the panel. Every time I sit through one of these things, I learn a lot. But let me tell you some of the problems that I have—and that I think other members have as well—is that I don't live this issue every single day of my life like many of you do. We've got 10 million other issues that we deal with.

We rely a lot on testimony like yourself and other things. I have heard from Scripps. I have visited with them. I have talked to them.

I hear Dr. Jenkins talk about, for example, Hawaii, as I understand, has secondary treatment already, but yet they have problems with some of the diseases with epidemia even in Hawaii.

Then I hear what I think that the primary problem is not necessarily with the sewage outflow, but much with the secondary and the run-off, and the other things.

I would like to take a look at what is really right. I live in Del Mar. I am not a surfer, Mr. Jenkins, but I am an avid diver. I dive out there in the kelp all the time. The last thing I want to do is be diving out there when it is not healthy. I have a bunch of buddies that you may join with the divers' club as well.

But what is the right answer? What are we able to do? As I understand it, Tacoma, Washington is even applying for a waiver because they haven't been able to meet the standards with EPA, but yet your testimony says that Tacoma has achieved that.

I am sure this Committee will be hearing further testimony. What is really the right thing for us to do? The chemical treatment that we have, I understand, is a difficult nut. There are varying opinions on it. If chemicals will treat it, then I think, yes, it is good deal. Can do that?

But from what I have heard, can you give us anything? I look at the people that support it—Scripps—which the doctor is part of. But yet I hear the other testimony. So it is a little bit confusing, I think, for members of the panel on what side to really adopt.

Thank you.

Mr. JENKINS. Would you like me to respond to that?

Mr. CUNNINGHAM. Yes, I would.

Mr. JENKINS. My testimony was primarily confined to the very near shore where people swim. I did not attempt to speak about the off-shore ecology because my experience is with the surfers.

But I think this is where the perception of clean water is primarily focused is in the number of beach closures. If you look at what closes beaches, it is non-point source pollution, urban run-off. The primary constituents are simply storm drain discharge, overflows, and leaks out of the sewer infrastructure.

So, if you want to measure the effectiveness of the Clean Water Act by reducing beach closures, you are going to look not at the treatment level at the plant, but in trying to get the sewage to the plant in the first place so that it doesn't leak and get into the storm drain system and become this urban run-off problem.

Mr. CUNNINGHAM. Most of us, including myself, will support the wetlands initiative that you had, and also the study for epidemia. I think that is a good idea.

But in your opinion, is the City's position valid, or do we need to go along with Mr. Simmons' idea, and the Sierra Club, of the chem-

ical treatment, or something beyond since you addressed mostly the close-in.

Mr. JENKINS. OK. Again, if you look at the levels of bacteria that could possibly arrive in the surfzone from an outfall several miles offshore, the dilution is so high that it is below the detection capabilities of these tests.

So clearly the pollution cannot come from the offshore outfall. I think that for the case of San Diego and perhaps other cities, they ought to be allowed to first spend their scarce dollars in the areas that will have the most immediate impact and will meet the most urgent concern of that particular location.

Mr. CUNNINGHAM. What about the ecology?

Mr. JENKINS. I think that is the spirit of the Integrated Coastal Management approach of the NRC. But that does not mean that you should perhaps back off from secondary for every American city.

I am simply saying that the standard for an ocean outfall ought to be different than the standard for an outfall in the Great Lakes. Perhaps the standard ought to be written in terms of physical constraints, like mixed layer depth, degree of stratification, and circulation.

These are the environmental factors that will control the dilution levels and, therefore, the needed treatment level of the plant.

Mr. CUNNINGHAM. I don't dive at 320 feet. But I know the ecology could be affected. I know we are looking at close-end, but I think we need to look at the ecology as well, as Mr. Simmons has indicated.

Thank you.

Mr. STUDDS. Thank you.

Mr. Filner.

Mr. FILNER. Thank you.

Mr. Simmons, I am Bob Filner, just so you are aware of that.

I was a little unprepared for the tone of the testimony that Mr. Simmons gave for a couple of reasons in that you are describing, for the record, the City's approach as wanting to weaken the Clean Water Act. I don't think there was any intention of weakening the Clean Water Act in the City's testimony, as I understand it.

Yet, you called for a waiver which seems to me is even stronger language for weakening the Act. That seems to me a little contradictory.

In addition, your statement about enhanced chemical processes would meet the standards of secondary treatment. As far as I understand it—I may need some scientific correction on this—but the enhanced chemical processes do not allow the BOD standards to be met, in which case you are advocating something that weakens the Clean Water Act, which seems to me contradictory.

If Ms. Schenk's hypothetical is correct, that is, the process does not work, and we are forced under the court order—which I want to make sure for the record, just in case the position you take was influenced by this at all—is that you are the counsel for an official intervenor in a legal case of EPA v. the City.

I hope that your statement is not just influenced by the legal necessities of what you have to say in public. If Ms. Schenk's hypothetical is correct, the expense of going to secondary would prevent

this City, I believe—given its fiscal constraints and the ratepayers' level of tolerance—for doing other things that are equally or more important environmentally, such as reclamation, such as conservation.

So I find the position a little bit contradictory and a little bit uncompromising. I don't know if you want to respond directly to that.

But my basic question to you—and I don't know if you are speaking for the Sierra Club today or just as an individual—but would you support, or would the Sierra Club support, the approach of moving to a water quality-based outlook as opposed to a technology-based requirement?

It seems to me that you are saying, if you strip away some of the things I guess you have to say for the legal case—on one hand you said you support going to enhanced chemical, but if it doesn't meet the BOD, you will ask for a waiver, which means that you are recognizing certain problems with the Act as it exists.

Ms. Weil made a statement in her testimony that the NRC report said there should be no exemptions to the Clean Water Act. As I read the report, it specifically states that the Clean Water Act should be amended to provide flexibility needed for the situations of coastal cities. I see some folks who are from the report shaking their heads yes.

But it seems to me that they are, in fact, calling for the very thing that the City has asked for. It is not a weakening of the Act. It is not getting around the Act. It is the flexibility in meeting the standards, given the unique situation of the coastal city, with deep water outfall, et cetera.

Either of you have a minute or two to respond.

Mr. SIMMONS. If I may respond, first of all.

First, my testimony is what I believe. It is not based on any legal positioning or posture. Secondly, I have worked four years on these issues. I have attended every trial, every evidentiary hearing. I have attended every deposition of every scientist. My opinions are based upon that.

Secondly, there is no contradiction in our position. We are simply saying this. The test results will be known in a couple of months. We are convinced, Mr. Filner, by our expert and the test results to date that using this additional system process, at slight additional treatment cost—the enhanced chemical that the scientists approved by the way—the city of San Diego can fully meet suspended solids requirements, and possibly BOD.

Suspended solid requirements, as you heard from previous witnesses, is the pollutant of concern. BOD is not. It is irrelevant.

Mr. FILNER. BOD is not?

Mr. SIMMONS. BOD is not.

Mr. FILNER. But it is one of the standards in the Clean Water Act which we have to comply with. So why is it of no concern?

Mr. SIMMONS. Because I think what you need to focus on is that Section 301(h) of the Act is part of the present law. It's a release valve section that is designed to do exactly what you and the National Science Foundation—

Mr. FILNER. Under the law, that waiver process is close to us. The law says we cannot ask for a waiver. The law says we have to go through the BOD. Now you are advocating a flexibility which I

agree with—that we should not be required through the BOD standards.

So you are advocating a flexibility which, on the one hand, you say we should not have on the other. I don't quite understand that.

Mr. SIMMONS. No, sir. Let me close this way. I am simply saying that I am convinced that our treatment process will work and fully comply. When the final report is in, the testimony before the courts shows that it does not fully comply on the BOD standard.

Then I can see the Sierra Club supporting the City—and the other parties agreeing—to a 301 waiver under existing law. No amendment is necessary—to allow a release of the BOD standard where there is combination of water conservation that we now have, and water reclamation—the effect of which, Mr. Filner, will be to reduce discharge.

Mr. FILNER. Well, it sounds like you are supporting a flexibility based on unique situations. I thank the Sierra Club for supporting it.

Mr. SIMMONS. Yes, sir. Under present law we have the flexibility built into the law.

Thank you.

Mr. STUDDS. Mr. Cunningham has asked if he may ask a very brief question. I recognize him.

Mr. CUNNINGHAM. Mr. Simmons answered my question in his last statement. Thank you.

Ms. WEIL. Mr. Chairman, could I respond to Mr. Filner's remark about my comment, please?

Mr. STUDDS. Yes, briefly, if you will.

Ms. WEIL. OK. I think, Mr. Filner, what I remember learning in law school is that there are usually two sides to every word like flexibility, or two arguments. I think what I expressly stated is that this report takes no position for exemptions for any particular municipality. We concur that none is justified. I did not state that the report says there should be no waivers.

Specifically I also testified that 301(h), in terms of issuing waivers, does provide for looking at situations on an individual case-by-case basis. That point was very well made in the Orange County Sanitation District case where it was determined after lots of analysis and testing that, indeed, a waiver was OK there and justified there. It was different than in San Diego and in L.A. County.

I think EPA has probably conducted more studies and analyses on Southern California coastal waters than anywhere else on these particular issues. Based on that, they are able to make certain distinctions. I think they very well did in Orange County as opposed to San Diego and L.A.

I think flexibility is just that. I think the Integrated Coastal Management approach should be that as well, that it should take into account looking at everything. It is a balancing act. I think that is what we are looking for as well.

Mr. FILNER. Would you support the opening up of the waiver process again; is that what you are saying?

Ms. WEIL. Well, if 301(h) is going to stay in the Clean Water Act, I think the waiver process may have to be looked at again. I think it may be used for individual cases.

It unfortunately is not a very simple question, especially in situations like L.A. County and San Diego County, that have gone on for years and years and years. Of course, we have seen escalating costs, but we have also seen escalating degradation, escalating sewage infrastructure breakdowns all over the country.

We really need to take a look at how to solve the problem now. I think everyone is going to have to balance interests, balance the economics, and figure out how we can best solve these problems today.

Future costs are going to be much greater. Future environmental problems are going to be much greater. Therefore today, I think it is especially important to take a look at a balanced approach. Unfortunately, it doesn't lend itself, as I see it, to an either/or situation.

Mr. FILNER. I just have one final statement, Mr. Chairman.

I just don't understand the testimony of either the Sierra Club or the Oceans Foundation that says that you don't want any change in law, but you will support going for opening up the waiver process again.

I mean, on the one hand you are saying no flexibility, and on the other hand you are saying almost unlimited administrative flexibility. I don't quite understand those positions. But that is my limited understanding.

Mr. STUDDS. OK. We have expired, rather, the time has expired. We may or may not have expired.

[Laughter.]

Mr. STUDDS. I want to thank the members of this panel.

We will now make a transition to the third and final panel which will be compromised of spokespersons for the EPA, for the National Research Council, for Scripps, and also the World Wildlife Fund.

You may take your time in the transition. We are going to declare a 10-minute recess. We will resume in as close to 10 minutes as we can.

[Recess.]

Mr. STUDDS. We will resume.

Before we begin with panel number three, let me again state my regrets of the necessity of leaving in just a few moments. I have had a chance already to skim your testimony. I will bring it with me and read it as we wing our way toward the other part of the country. I hope you will not construe that as anything other than the necessities of a schedule.

I also want to express my appreciation of the ability to see my colleagues from California in their natural habitat. There is a great deal of value, beyond the immediate substance of a hearing, for Members of Congress to be able to remove themselves from time to time from their own world, and to visit the world of others. Thanks for understanding. That makes for good things.

I thank Ms. Schenk, Mr. Cunningham, and Mr. Filner for their hospitality and for all of you. When I do leave shortly, Ms. Schenk will take over the chair. I am sure she will rein with great distinction.

Ms. SCHENK. Mr. Chairman, if I may, as a point of personal privilege, I just want to take a moment again to thank you on behalf of

my colleagues and on behalf of San Diego for your effort in coming here and listening.

You have enhanced my credibility because I have told one and all who would listen what an extraordinary chairman you are. Your intelligence, your wit, your commitment to these issues—

Mr. STUDDS. You are recognized indefinitely.

[Laughter.]

Ms. SCHENK [PRESIDING]. Thank you for showing that I do tell the truth, despite my profession. Again, I wish you a safe journey back to Washington. We will see you next week. Thank you again.

Mr. STUDDS. Thank you. Very good. I look forward to the opportunity to welcome you, Brother Cunningham, and Brother Filner to the other ocean.

We will begin with Dr. Tudor Davies who is no stranger to this Committee and who has somehow escaped Washington. I don't know how you did that. Congratulations.

He has the ghastly Washington title of Acting Deputy Assistant Administration—there are probably some other words that have been omitted—of the Environmental Protection Agency.

Dr. Davies, welcome.

STATEMENT OF DR. TUDOR DAVIES, ACTING DEPUTY ASSISTANT ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY; ACCOMPANIED BY: WALKER SMITH, ASSISTANT CHIEF OF THE ENVIRONMENTAL ENFORCEMENT SECTION, DEPARTMENT OF JUSTICE, HUGH BOWER, REGION IX, ENVIRONMENTAL PROTECTION AGENCY, DR. MIA TEGNER, RESEARCH MARINE BIOLOGIST, SCRIPPS INSTITUTION OF OCEANOGRAPHY, UNIVERSITY OF CALIFORNIA, DR. JOHN BOLAND, CHAIR, COMMITTEE ON WASTEWATER MANAGEMENT FOR COASTAL URBAN AREAS, NATIONAL RESEARCH COUNCIL; AND WILLIAM EICHBAUM, VICE PRESIDENT, WORLD WILDLIFE FUND

STATEMENT OF TUDOR DAVIES, ACTING DEPUTY ASSISTANT ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY

Dr. DAVIES. Thank you, Mr. Chairman. It is good to see you again in very different circumstances.

I have with me today Ms. Walker Smith, who is the Assistant Chief of the Environmental Enforcement Section of the Department of Justice, who will be very pleased to answer any specific questions you have, and Mr. Hugh Barrow from our Region IX who is the attorney working specifically with the San Diego, California/EPA case.

You didn't ask me this in the letter that you wrote me asking me to testify, but let me make one or two brief comments on the National Academy Study. We like the National Academy Study. We think the concept of integrated coastal management is something we should be moving toward. In the Chesapeake Bay, in the Great Lakes, in the National Estuary Program and in other areas in the country we are expecting to do this. However, we have one slight difference, perhaps, with some of the Academy panel members in that we believe that the technology-based floor that currently exists should be maintained, both for municipal sources and for industrial sources.

We see a regulatory system that we have been able to manage. We have made enormous progress in getting industry, both direct and indirect dischargers, into compliance, and we have something like 99 percent of the municipalities who are now within the National Municipal Policy, either achieving secondary treatment with good pretreatment programs, or on a schedule to achieve this.

As you know, the Clean Water Act requires sewage discharges to meet secondary treatment. The Congress allowed an opportunity to seek a waiver from secondary treatment requirements for coastal dischargers; that was the waiver provision in Section 301(h), and that provision has been progressively tightened by the Congress as it has reauthorized the Clean Water Act.

The waiver provides that if you achieve water quality standards, maintain a balanced indigenous population and protect recreational uses, and have the equivalent of secondary treatment for toxics removal, you get a waiver from the Clean Water Act requirement for secondary treatment.

We had 208 applications, 39 were approved, 76 denied, 9 are pending, and we had 86 withdrawals, one of which was San Diego. You asked me in your introductory letter to summarize the status of San Diego's compliance, and let me just briefly review part of my statement, and then I will conclude.

In 1986, EPA tentatively determined that San Diego's application, and more specifically San Diego's Point Loma Plant did not meet the environmental criteria for the 301(h) waiver. EPA concluded the San Diego's discharge was damaging the indigenous biological communities and did not protect recreation use of the Point Loma Kelp Beds. The plant caused frequent exceedences of California water quality standards needed to protect body-contact recreation.

San Diego then elected to withdraw its 301(h) waiver application. It has yet to upgrade its waste water treatment to meet the Clean Water Act requirements, and in 1988, the U.S. and the State of California filed suit against San Diego to compel compliance with secondary treatment standards and to address other Clean Water Act violations.

In 1990, San Diego entered into a consent decree with the U.S. and California, which included a plan to maximize waste water reclamation and upgrade secondary treatments. San Diego selected this approach to aid in addressing its long-term water supply problems, and EPA strongly supported San Diego's decision to maximize reclamation.

To address San Diego's long-standing violations of water quality standards to protect recreational users of kelp beds, the decree required the city to remedy the water quality standards violations, and the city is extending its outfall. The outfall is currently under construction and the court required completion of the outfall extension by August '94.

In the interim, the court ordered San Diego to quarantine the kelp beds from recreational diving if violations of water quality standards occurred more than 25 percent of the time. However, in May 1992, San Diego adopted a new approach and, although San Diego is continuing construction of the outfall extension, it is no longer planning to build five of the six reclamation plants, the pro-

posed new secondary treatment plant, nor the upgrade of Point Loma to secondary treatment. The new approach does not comply with the secondary treatment requirements of the Clean Water Act, neither does this approach comply with the terms of the consent decree. Thus, as you were aware, EPA and the State of California have continued their enforcement efforts.

On that point, I think I will stop and allow the other panelists to make their statements.

[The prepared statement of Mr. Davies can be found at the end of the hearing.]

Ms. SCHENK. Thank you, Dr. Davies. You have obviously had experience doing this.

We will now turn to Dr. Mia Tegner.

STATEMENT OF MIA TEGNER, Ph.D., RESEARCH MARINE BIOLOGIST, SCRIPPS INSTITUTE OF OCEANOGRAPHY, UNIVERSITY OF CALIFORNIA

Ms. TEGNER. Thank you, Madam Chairman and members of the Committee for allowing me the opportunity to testify on Clean Water Act issues relevant to the city of San Diego.

I am Mia Tegner, a research marine biologist at Scripps Institution of Oceanography. I am a kelp forest ecologist. I've spent the last twenty years working in the Point Loma Kelp Forest off the San Diego discharge. My knowledge of local oceanography and this research experience has led to my participation in the question of the proper level of sewage treatment for San Diego, and has me here today.

San Diego's sewage is discharged off a straight-line open coastline. Coastal currents and tides provide high energy mixing processes. In contrast with the broad shelves characteristic of much of the United States, the shelf of San Diego is very narrow with very deep water very close to shore. The present outfall is two-and-a-half miles long and discharges into 220 feet. When the outfall extension is completed in a few months, discharge will be four-and-a-half miles offshore and 320 feet, one of the longest and deepest outfalls in the world.

The initial dilution, which is the most effective phase of the mixing process, will be increased from about 113 to 1 to a most probable number of 310 to 1. With the extended outfall, the top of the waste field will be confined to water deeper than divers are likely to go into on any sane diving schedule.

Because of this tremendous dilution and mixing potential, BOD is not an issue in San Diego. BOD is a problem of fresh water, of lakes, of marine water bodies with limited volume. It is not a problem in San Diego.

The narrow shelves which lead to high mixing rates between coastal waters and the deep ocean are typical of much of the West Coast and some Hawaiian Island sites. The NRC report, which you are going to hear more about shortly, concluded that ocean outfalls should be considered as part of the treatment process. San Diego's deep outfall combined with local oceanographic conditions optimize this part of the treatment process, and the result is so effective that secondary treatment is not needed to protect the ocean.

Research supporting my conclusion falls into four categories, the kelp forest, the sand bottom community, coliform levels, and the 1992 spill. Sewage does harm kelp forests, and we demonstrated that very well in San Diego. In the 1950's and early 1960's, raw or poorly treated sewage was discharged in the San Diego Bay. As the bay flushed under the tidal regime, this water came into the kelp forest and we had historic lows during that period. Since that time, the deep water outfall has been constructed. We have a good source control program. We have advanced primary treatment, and today there is no clear effect of the discharge on the kelp forest. The kelp forest has varied enormously in size over the last decade in response to natural events. We look at the recovery rate from these natural disturbances, and it has been very high, much higher than it was during the period when sewage was clearly impacting the forest.

Another issue is the sand bottom community right around the outfall itself. The city of San Diego operates an extensive monitoring program and there is considerable evidence that this habitat is healthy. There are no anoxic sediments, no evidence of fin rot or other pollution indicators. Essentially all the species are there at normal densities, and there is no evidence that either the bottom community or the water column are adversely affected.

I want to add to my written testimony where there are many more details from what I can tell you in five minutes. A scientific paper published with the aid of the California Sea Grant Program that looked at the water column issues and found no effects.

Mr. Simmons was right, the Judge did find the city of San Diego was out of compliance on one environmental issue, and that is the issue of coliforms, that coliform levels do not meet the State Ocean Plan requirements along the outer edge of the kelp forest. This problem will be solved with the extension of the outfall, which is presently under construction.

The sewage spill offered us a worst case scenario to look at the effects of treated sewage on a biological community. There were short-term effects, mostly physical. The dark cloud of particulates reduced light going to the bottom reducing plant growth and plant germination, but we have measured no impact on animal populations. The affects on plant populations were very short-lived, and today, within months after the spill, there is no evidence whatsoever that this even happened.

In comparison with natural disturbances we have documented, ecological effects of the outfall break were trivial. This is strong evidence that the effluence subject to pretreatment at the source, followed by advanced primary treatment and diffused appropriately through a deep water outfall is not environmentally harmful.

In conclusion, I strongly urge you to consider San Diego's open coastal deep water environment, and its proven ability to assimilate treated waste water in the reauthorization of the Clean Water Act that is before you.

Thank you.

[The prepared statement of Ms. Tegner can be found at the end of the hearing.]

Ms. SCHENK. Thank you very much, Dr. Tegner.

Without objection, your testimony and your exhibits will be entered into the record.

I would now turn to Dr. John Boland of the National Research Council.

Dr. Boland.

STATEMENT OF JOHN J. BOLAND, CHAIR, COMMITTEE ON WASTEWATER MANAGEMENT FOR COASTAL URBAN AREAS, NATIONAL RESEARCH COUNCIL

Mr. BOLAND. Thank you, Madam Chairman.

My name is John Boland. As you have heard, I was Chair of the National Research Council Committee on Managing Waste Water in Urban Coastal Environments. In my real life, I am a professor at the Johns Hopkins University in Baltimore where I specialize in environmental economics policy.

With me here on my right today is William Eichbaum from the World Wildlife Fund. Mr. Eichbaum is also a member of the National Research Council Committee. He is an environmental attorney and a public policy expert with experience in managing environmental programs in Massachusetts, and Maryland, and Pennsylvania.

I would like to say before I go on, Madam Chairman, that speaking on behalf of the whole National Research Council Committee, we are very grateful to Chairman Studds and to the other members of the Committee for your interest in our study and your willingness to give us an opportunity to discuss it.

I submitted some written testimony. I would like to use the few minutes allotted to me here to move beyond that testimony and go directly to the major finding of the report. There are many other findings and conclusions which I won't refer to here. That major finding is of interest because it has been referred to so many times this morning by other witnesses, and also because it is the finding of the Committee that goes, one might say, to the very heart and soul of the Clean Water Act.

For 20 years, the Nation has devoted considerable resources to water pollution abatement. We have spent about \$76 billion for municipal waste water treatment plants alone during that time. In return, the Clean Water Act has delivered impressive results, as has been noted by other speakers. We have seen lakes and rivers throughout the country cleaned up really at very rapid rates, in some cases much faster than had been anticipated.

But in the coastal areas, where about a third of the population of America lives, the story is not so optimistic. The coastal areas are assaulted every day by about ten billion gallons of municipal waste water, about 11 billion gallons of industrial waste water, as well as unmeasured quantities of urban runoff. These are the areas, particularly the estuaries and embayments that contain some of the most complex and fragile ecosystems in our environment, and yet the quality, despite considerable abatement efforts, the quality of many of the coastal waters is about the same or worse than it was 20 years ago.

In considering this problem, the Committee finds that the fragmented, end-of-pipe oriented, technology-based approach of the

Clean Water Act is no longer appropriate to the water quality needs of the coastal regions of the country. We note that application of that act in the last 20 years has led to cases of undercontrol where prescribed treatment does not address some existing problems as well as allegations of overcontrol where communities are complaining that they are being required to install expensive treatment facilities with little or no prospect of measurable improvement of water quality.

I should add at this point that the Committee did not investigate any of these claims and takes no position on any of them, including San Diego, Boston, et cetera.

We propose, therefore, an alternative policy. We recommend that waste water and storm water management and protection strategies for coastal urban areas should be developed and implemented within a system of integrated coastal management. Integrated coastal management considers first the ecological and human use objectives appropriate to a region, then it determines the water and sediment quality that is needed to achieve those objectives, next it considers all sources of pollutants, natural and manmade, in the region. A management strategy is devised which meets the objectives in an effective and cost-effective way. The strategy is iterative, the management plan is continuously modified as experience and new information may dictate so that ecological and human use objectives are protected despite change in circumstances.

The report provides much more information on integrated coastal management. I would just like to call attention to a few points that may be of interest. One is that it is inherently a regional strategy. What is appropriate for one region is not necessarily appropriate for another. Regions are to be defined according to physical and ecological criteria not necessarily according to political boundaries.

This is comparable to the concept of a watershed in surface water studies, and the idea of the regional approach is comparable to a watershed-based plan for surface water.

A second point is that integrated coastal management is a creature of local initiative, as we describe it. We do not recommend that it be imposed from above, rather confederations of State and local agencies should voluntarily enter into this process in order to achieve flexibility and cost-effectiveness. Where local agents are unable or unwilling to do this, the existing regulatory structure might well apply, for example, the existing Clean Water Act.

The third specific point I would like to make is that the role of the Federal Government under integrated coastal management would be fundamentally different. First, Congress and U.S. EPA must provide the opportunity and the incentive for integrated coastal management. Then for those regions that choose this option, EPA must shift its focus away from specifying technology and away from focusing on end-of-pipe discharges to the ultimate performance of regional plans: do they restore and maintain the integrity of coastal ecosystems? Do they protect important human uses and values?

Thank you very much, Madam Chairman.

[The prepared statement of Mr. Boland can be found at the end of the hearing.]

Ms. SCHENK. Thank you, Dr. Boland.

I understand that Mr. Eichbaum, you are not going to testify and but you are available for questions.

Mr. EICHBAUM. No. It is always a pleasure to appear before the Committee, but if there are any questions that I can answer, I will be happy to.

Ms. SCHENK. You will be available. Thank you very much.

Dr. Boland, if I may, do you believe that we now have both the institutional and technological capabilities to implement the ICM as recommended by the report?

Mr. BOLAND. The Committee is persuaded that the institutional and technological capabilities do exist in many regions, not by any means in all regions. The idea is that those regions that possess the ability and who have the desire and who have the incentive would be committed to engage in an integrated coastal management process. If that produces positive results for those regions that might encourage other regions to develop that capability.

We do believe that capability exists in many places throughout the country.

Ms. SCHENK. How about here in San Diego?

Mr. BOLAND. I think the Committee received presentations on the work that had been done in San Diego and I would say that they were very positively impressed by the level of analysis that had taken place here, so that I would imagine if the Committee had been asked that question they would say probably.

Ms. SCHENK. Thank you.

Dr. Tegner, just so that I understand your testimony, is it that you believe that secondary treatment is unnecessary for San Diego?

Ms. TEGNER. That is correct. I do not believe that there are environmental impacts on either the kelp forest or the soft bottom community under the present system of advanced primary treatment. Given that there are no impacts, it is hard to see how we are going to improve upon that. I would hate to see us spend so much money and have there be no benefit to the environment.

A particularly compelling case in this regard is a small outfall in Northern San Diego County, the Encina Outfall, which has conducted the primary level of monitoring after three years of secondary treatment. This is a small discharger, but going to secondary has not allowed them to detect any changes in the environment. The changes are apparent in the effluents but not in the environment.

In the case of San Diego, where it such a huge expenditure, I really think we have much more urgent environmental problems that that money should be spent upon.

Ms. SCHENK. Dr. Tegner, I want to ask you if you could somehow quantify whether this is a consensus view in the scientific community, a large consensus, a small consensus, a 50/50 consensus?

Ms. TEGNER. Certainly all my colleagues at Scripps are in agreement, secondary treatment is not needed for San Diego. I know of the difficulties that were found in trying to get any scientists to, in fact, testify in favor of going to secondary in San Diego, and I

would differentiate between those scientists who make themselves known by the media versus those scientists who make their reputations via publication in the refereed scientific literature, and I think there have been no scientists who have achieved their reputations via peer review who have said San Diego needs secondary treatment.

Ms. SCHENK. I actually have a question for both Dr. Davies and for you, Dr. Tegner, and I hope you can respond as to what you see the other environmental problems that are occurring off of the San Diego Coast, and how do they compare to the degradation effects of the sewage outfall?

Ms. TEGNER. May I answer that?

Ms. SCHENK. Yes, please.

Ms. TEGNER. We have serious problems with stuff coming out of storm drains, with stuff coming out of the San Diego River. In contrast to the really rather benign conditions at the end of the outfall, the NOAA Status and Trends Program has looked at San Diego Bay and said that this is a serious hot spot for a number of pollutants. We have the continuing disaster of Tijuana sewage. We have serious environmental problems with our wetlands. We are losing scarce inter tidal habitats. These are a number of problems that I think we would be much better off if we spent our funds on rather than further cleaning up an outfall which has no impact on the environment.

Ms. SCHENK. Thank you.

Dr. Davies, do you have a comment on that?

Dr. DAVIES. My only comment is that I think we do have a serious problem with Tijuana. I think the Congress is right, at this point in time, in terms of how it does deal with this international problem. I think that it is causing environmental and human health impacts, and I wish the Congress luck in fixing the problem.

Ms. SCHENK. My question was, how do some of these other problems compare in terms of the degradation that we see from the Point Loma sewage outfall?

Dr. DAVIES. My information is based upon some knowledge of the 301(h) waiver submission in which there was a record of degradation around the outfall. There were accumulations of contamination material in the footprint of the outfall, and I understand that there are viral and bacterial concerns caused by the outfall in the kelp beds. That may also be due to local source contributions. I am a little surprised to hear that storm water runoff as being a major issue in San Diego. It seems to be a pretty dry region, and I wouldn't give it the same priority as I would perhaps in Boston, however, you may have lots of local contamination that occasionally is washed into the ocean.

I am familiar with the fact that you do have some toxic substances in the sediment in the bay that are not being contributed anymore, because we have instituted a technology-based approach to dealing with our industrial discharges, and we are developing a good pretreatment system in San Diego that reduces at the source the toxins that are discharged into the sewer system.

Ms. SCHENK. I see we have run out of time, so I will now turn to my distinguished colleague, the ranking Republican member of the Committee, Randy Cunningham.

Mr. CUNNINGHAM. I would like unanimous consent of my colleagues to submit a letter from Roger Revelle, Professor of Oceanography at Scripps to former Congressman Robert Roe, Chairman of the Public Works and Transportation Committee.

Ms. SCHENK. Without objection.

[The information referred to can be found at the end of the hearing.]

Mr. CUNNINGHAM. Dr. Davies, I was interested in your comments about the major coastal cities that have complied, and I sat down and wrote them down, the ones that I know, and I look and I see Philadelphia discharges into a river; Baltimore discharges into a river; Washington, DC, the Potomac; Portland a river; Oakland is into a bay; San Francisco, of course, is into a bay; and I would at least hope that you would concede that San Diego has a very different situation from those areas in which they are dumping into rivers and bays that basically stay sedimentary, or would pollute directly, and I would like to reiterate to Dr. Tegner that I very seldom dive below 200 feet. At 100 feet, you don't have much time, 200 feet is where the big sharks start, and you stay away from that.

Another thing that I would like to question you about, Dr. Davies, is along the line of Mr. Filner's question, and I am sure you heard the testimony that went on before, with the chemical treating, the questions about flexibility, would the EPA be open to waivers, are we going down a wrong road if we pursue that means or, for example, if the chemical treatment does prove adequate, would EPA accept that, and what are your basic dealings on the testimony you heard before as far as the different directions that San Diego could go?

Dr. DAVIES. If I can remember all those questions. One of the things I would like to respond to is the first remark, if you look at Washington, DC. Washington, DC has a significantly enhanced waste treatment, way beyond secondary treatment for its waste water treatment systems. It has spent significantly more money than San Diego probably will, and I think that if you look at the results in the Potomac, where all of you live part of your life, you will find that it is now a significantly improved ecosystem, where we have fishable and swimmable waters.

Mr. CUNNINGHAM. That water is only 20 feet deep, in some cases 30, and I know there was a catfish in there three weeks ago.

Dr. DAVIES. They have also had bass fishing tournaments there that they never had before. If you go back and even read about Lincoln's time, it was stinking sewer at that point in time.

What we are doing with our secondary treatment requirements is, setting limits. We are not requiring a technology. We are saying, if you can meet these reductions, then you meet the intent of the Clean Water Act. We are not prescribing the technologies. We are prescribing the limits, and that is the case with all of our so-called "technology-based requirements." We set the limits, even for industrial sources.

What we do in the guidelines and the pretreatment standards is, we say, at this concentration or at this volume, if you meet that, then you have met our requirements.

Mr. CUNNINGHAM. Let me redirect my question. My question is for Dr. Davies, Dr. Tegner and other scientists, do you feel, as EPA,

that we meet those standards or with the chemical treatment that we can achieve that and, if not, along Mr. Filner's line, are waivers going to be available in the future?

Dr. DAVIES. My technical people tell me that they will not meet the requirements, and we are looking for this test to tell us something different, particularly for BOD. We do not think that there are waivers available to you at the moment, that under the 301(h) Act that you have withdrawn your application, and I will turn to my counsel on that and ask for a very specific response, but I think that we asked our general counsel for some sort of a ruling on this and my understanding is that a 301(h) waiver is not available to San Diego.

Mr. CUNNINGHAM. Even if we prove that our treatment does meet your standards?

Dr. DAVIES. If it meets the secondary standards, then it does not need a waiver.

Mr. CUNNINGHAM. Chemical treatment?

Dr. DAVIES. If the technology that you want to invest in meets the standards set by our regulations, then that is acceptable to us. I think there were other questions, but I have frankly forgotten them.

Mr. CUNNINGHAM. I think you answered the questions, but I would like you to consider that they do meet a standard, but those standards are in 20 feet of water, and we have 320 feet of water that this would come out into and it is a totally different situation, in our opinion.

Ms. SCHENK. Thank you.

Mr. Filner?

Mr. FILNER. Thank you, Madam Chairman. It is nice to say "Madam Chairman" to a fellow freshperson.

Actually, Madam Chair, that wise and wonderful former Congressman Morris Udall used to advise freshmen not to bother to learn the names of Congress people but just call everybody "Mr. Chairman," and they would be right 62 percent of the time.

I just want to more directly ask Dr. Davies—it is good to see you again—the question that Congressman Cunningham asked, just very specifically because it gets, I think, to some of the problems that the city is facing.

Let's assume the reverse hypothetical that Ms. Schenk asked, enhanced chemical treatment does, in fact, "work," that is, allows us to meet the standards, limits, whatever you want to say, of dissolved solids, but does not meet the BOD standard.

EPA, as I understand you, would find the city in violation of the Clean Water Act?

Dr. DAVIES. That's correct.

Mr. FILNER. We are in violation of the Clean Water Act for not meeting a standard that by all testimony, and corroborate me, Mr. Boland or Mr. Eichbaum, that the BOD standard has no relevance to the situation we find ourselves in; do you agree with their testimony?

Dr. DAVIES. I think the main item that we should consider here is that we have a law that is on the books that the Congress passed that EPA is charged with enforcing.

Mr. FILNER. I hope the audience notices the problem that sometimes we, as Congress people, have with people who are doing their job, trying to fulfill the law, and are in a court case, and you don't want to directly answer the question.

Do you believe that BOD is a standard that San Diego's deep ocean situation ought to meet?

Dr. DAVIES. Are you asking me for a personal scientific opinion?

Mr. CUNNINGHAM. Your scientific opinion, not what the law states. We know what the law states, he has testified to that.

Dr. DAVIES. Under certain circumstances, in terms of environmental harm, I could agree that BOD is not an important variable.

Mr. CUNNINGHAM. If that is the case, how would you recommend that the law be changed to take that into account, again the hypothetical is a form of treatment, whatever you want to say, it meets the dissolved solids, it does not meet BOD, according to your personal scientific opinion the standard may not make sense here, how do we write a law that allows us to meet the standards of dissolved solids but, in our situation, we don't have to meet the BOD standards, could you give us some advise?

Dr. DAVIES. I am not sure I have a fix for you. I am very concerned that if you write waiver provisions that will open the door for other circumstances, for other discharges that perhaps don't have the same environmental circumstances you do, and you will undercut environmental progress that has been made in this country for marine discharges that are required treatment.

Mr. CUNNINGHAM. This is the problem that we, as Congress people for this area, are wrestling with, and we need your help on this, by the way. We understand that very point. We do not want to open up that act to all these presumed problems and horror stories that you can hypothetically claim, but we also want to meet what everybody has testified here today is not meet a stupid standard and then spend a couple of billion dollars to meet it when everybody says we shouldn't meet it.

So how do we write the law that allows us that flexibility without opening a can of worms?

I don't know the answer to that. We need some help. We don't need, I don't think, you to say the law says this and, therefore, I have to apply it. We need help to say, let us work together to change that law. If the 75 percent that was mentioned earlier is not the way to do it, give us a way to do it.

I asked Mr. Eichbaum earlier in another hearing, and maybe he has had time to think about it, what would a legislative language look like that would involve using an ICM approach, because ICM is a process not a standard, and can we write legislation that says something to the effect that an ICM submitted to the administrator for approval that meets some list of things would be an acceptable alternative to secondary treatment.

Could you see that as a way to approach this?

Dr. DAVIES. Can I speak hypothetically, since everybody else seems able to. Would you look in this new statute that you are about to write, as requiring the same amount of money be spent on ICM as would be spent on secondary treatment?

Mr. CUNNINGHAM. I don't think the requirement is money. I think the requirement is, are we doing the environmentally sensi-

tive and reasonable thing. If ICM, taking into account all the things, happens to cost more, that is the way the chips fall where they may, but the issue is not the money in the legislative process. It seems that the issue is what are sensible standards that allow us to take into account the known science and the differing environments, literally, that we find ourselves in.

So I would hope that you would help us and not act in a bureaucratic fashion and say, here is the law, we have to enforce it. Help us change the law not to open the floodgates, not to weaken the act, but to make it sensible and reasonable so that people do not become anti-environmental because we do stupid things in the name of the environment.

Dr. DAVIES. Can I respond just for a moment?

Ms. SCHENK. Yes.

Dr. DAVIES. EPA staff has been trying to work with you. We have had numerous meetings and had discussions on alternatives, so I think that we are concerned at the moment in giving you a clean answer on what the act says and what we have the power to do at this point in time. But we have been working with the Congress very extensively. The Acting Assistant Administrator for Water is spending all her time at this point in attending weekly hearings on the Clean Water Act, on the Senate version of the Clean Water Act. So I think EPA is struggling manfully and womanfully to—

Mr. CUNNINGHAM. I know Ms. Schenk and I want to acknowledge that the Administrator has met with us on this issue directly, and we know there are constraints because of the legal situation, but we hope that we could, based on testimony today, the variety of perspectives, but there were some commonalities, and I think we can arrive at a legislative solution based on those commonalities all working together, and I hope Mr. Eichbaum doesn't waste his trip if he can give in 30 seconds some answers I asked earlier?

Ms. SCHENK. I assume there is no objection if we extend?

[No response.]

Ms. SCHENK. Thank you.

Mr. EICHBAUM. I apologize, since we appeared before you last week, I haven't yet finalized the solution. It was a long airplane ride, but I still didn't get there.

I think our Committee believes that the integrated coastal management process, which as you correctly point out is a process, does offer and opportunity to arrive at management and cleanup actions which are responsive, as John Boland said, to the real environmental conditions that exist in the geographical and the ecologically defined area and, to do that, reaching beyond, where appropriate, those sources of pollution or activities which are causing adverse effects.

How that gets crafted in the detailed language of a Reauthorized Clean Water Act, I think, is something that the issues that EPA has proposed with watershed management, that we have proposed with integrated coastal management, I think we need to work on it over the next several months.

I also just want to emphasize that the Chairman's reference to the work that the Committee has done on funding of addressing new problems, I think, is a very important component of this, and

without bringing that in to the overall solution, I don't think we can make any progress, because I think there has to be a commitment and a reality that, if you are going to allow more complex situations or require more complex situations to be controlled, then, in fact, you have the mechanism to provide the funding to do it.

Ms. SCHENK. Thank you very much.

Our time has expired. I will now turn to Congressman Cunningham for a closing remark.

Mr. CUNNINGHAM. Thank you.

Again, I would like to thank the panel. Dr. Davies, I want to assure you that this pains me to the quick to have to say this, but during the Bush Administration this was the same exact problem. With former Administrator Bill Reilly, there was a very difficult situation trying to isolate San Diego. The National Academy of Sciences wouldn't come forward because they didn't want to weaken the Clean Water Act.

Congressman Filner is exactly correct, this is the crux. We have the merit in San Diego. There is merit there to what we are saying, we have the evidence, and all we are asking for, my colleagues and myself, is for you to help us because the merit is there. We don't want to weaken the Clean Water Act but, yet, we need help, and we ask that desperately of you.

Thank you.

Ms. SCHENK. Thank you, Mr. Cunningham.

Mr. Filner.

Mr. FILNER. Just very briefly, and also I want to ask one little last question, Dr. Davies.

Given your answer about opening up some other horror problems, would you support reopening the waiver process which, as I understand it, we are denied from applying for right now?

Dr. DAVIES. I didn't like 301(h). We spent a lot of resources on it.

Mr. FILNER. This is not a personal answer, this is an EPA answer?

Dr. DAVIES. I would say both, personally and EPA. Although you were trying to achieve a consensus scientific position here, what we found in looking at data and trying to make decisions on whether we had a balanced indigenous population, whether we had recreation impacts from discharges, whether—

Mr. FILNER. Is the answer no?

Dr. DAVIES. I would prefer not to go that way.

Mr. FILNER. Just in summary then, I think the problem before us is clear, and the people in San Diego have to get together and help the congressional folks also on this. I think there is a recognition that change is needed, yet there is both—I will say "bureaucratic," and I don't mean that negatively—I will say professional and political resistance to any change, and we need to find a way here in San Diego to get that change, taking into account both that professional and political resistance, and that is not going to be easy.

We are going to work, as I think Ms. Schenk and Mr. Cunningham said earlier, this delegation of five San Diego Congress people are united, really for the first time in a very organized fashion, we meet regularly. We are going to be working together to get

that bipartisan and Washington-San Diego consensus that hopefully also has EPA onboard with us to make those changes.

Ms. SCHENK. Thank you, Mr. Filner.

In closing, I would just like to say that I echo exactly what Mr. Cunningham and Mr. Filner have said here. We need the help, but the only way we are going to get the help is if we work together, the local political leadership, the local environmental leadership, the EPA, the scientific community, and we in the Congress. We in the Congress from this delegation are prepared to do our part, but we can't do it alone. A hearing such as this, I think, is enormously useful to bring out some of the issues, to focus, to clarify where we need to move forward.

In absentia, again, I would like to thank our Chairman Gerry Studds of Massachusetts for making the effort to bring this hearing to San Diego, although he is not here, he was quite right, the most important people have stayed, and that is the professional staff and the ones who are going to be the impetus to help us solve these problems, and I want to publicly thank Mr. Ashe and his staff for all of his work and support.

I want to thank the audience for sitting so patiently and listening. I know that you have learned as much as we have on this side of the table.

To each panelist, we owe you an enormous debt of gratitude for taking the time and making the effort to come here and help enlighten us.

To the staff of the UCSD, we all thank you for hosting us and for your generous hospitality.

To my own staff here in San Diego, you have done a great job. Now we will have to bring more hearings, since you have had this experience, and I see them throwing darts at me.

To my very distinguished colleague and good friend, Mr. Cunningham, thank you so much for participating. It is really a very pleasant experience to be able to work in this bipartisan fashion with members on the other side of the aisle on this Committee, and to my good friend Bob Filner who has been a real leader and a champion of this cause for many, many years, and will, I am sure, with his tenacity and his intelligence be able to help us to bring this to resolution.

With that, this hearing stands adjourned, and thank you very much.

[Whereupon, the hearing was adjourned and the following was submitted for the record:]

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PUBLIC WORKS AND
TRANSPORTATION COMMITTEE

VETERANS' AFFAIRS
COMMITTEE

CONGRESS OF THE UNITED STATES
HOUSE OF REPRESENTATIVES
STATEMENT OF CONGRESSMAN

BOB FILNER

BEFORE THE SUBCOMMITTEE ON ENVIRONMENT

AND NATURAL RESOURCES

FIELD HEARING--SAN DIEGO

JULY 8, 1993

I would like to first thank the Chairman of the House Merchant Marine and Fisheries Committee, Congressman Gerry Studds, for convening this hearing before the Subcommittee on Environment and Natural Resources, which he also chairs. I certainly appreciate the efforts you have made to make this hearing a reality. I would also like to thank my colleague--Lynn Schenk--for bringing this hearing to San Diego. This forum gives the local representatives of the City of San Diego a wonderful opportunity to discuss various issues relative to the Clean Water Act.

Since its original enactment 20 years ago, the Clean Water Act has been a cornerstone in the Nation's efforts to improve water quality. The results have been impressive, especially in our lakes and rivers.

However, the results in coastal areas are more mixed. Current law does not address regional variations or allow us to respond to changing needs and improved technology.

The Clean Water Act prescribes uniform technology-based standards--regardless of their applicability to the local environmental situation. A key standard, for example, is Biochemical Oxygen Demand (BOD). Yet, when dealing with open coastal waters, recent studies indicate that "the depletion of dissolved oxygen is generally not of ecological concern."

It is in this context that the National Research Council's report: **MANAGING WASTEWATER IN COASTAL URBAN AREAS**, and its advocacy of an Integrated Coastal Management (ICM) approach to wastewater treatment is so important. ICM gives us a scientific basis for moving away from technology-based regulations to an environmental quality-based approach. Under the ICM process, "the federal role shifts from that of prescriptive mandate to a partnership with regional authorities in developing a management system that meets coastal-quality objectives."

The increase in population in coastal regions, the changing mix of

land use activities, increased environmental awareness, demands for cleaner, more diverse coastal environments and significant advances in scientific understanding of coastal processes--not to mention severe budgetary constraints--all argue for a new approach to coastal environmental management. Current law does not allow us to keep pace with increasing pressures on coastal environments let alone rehabilitate already degraded environments.

I believe the recommendations of this important study provide the basis for amending the Clean Water Act in order to take into account the unique situation of coastal cities. Communities must be given the flexibility to address legitimate environmental problems in a fiscally sound manner.

I am very pleased to be a part of this hearing today and again wish to thank the Chairman for his interest in this matter.

Testimony of Honorable Susan Golding
Mayor, City of San Diego

Subcommittee on Environment and Natural Resources
of the U. S. House of Representatives
Committee on Merchant Marine and Fisheries
Field Hearing on the Clean Water Act



July 8, 1993

Mr. Chairman, members of the Committee, and members of the City's Congressional Delegation, I am privileged to welcome you, Chairman Studds, and to thank you and your Committee members on behalf of the citizens of San Diego for holding this hearing in San Diego today.

Mr. Chairman, our constituents in Eastern Massachusetts and San Diego have much more in common than most people would know. Our citizens face very similar and threatening situations, for very different reasons.

Unlike Boston, our solution is not in major federal funding assistance, but is in the amendment of the Clean Water Act to allow San Diego to continue a wastewater management program that does and will continue to meet the California Ocean Plan requirements. This is a specific example of a way for the Congress to reduce the costs of Clean Water Act compliance without sacrificing any water quality goals.

We are asking you to allow San Diego ratepayers to save \$1 billion with no reduction in the protection to the environment by reauthorizing the Clean Water Act to allow for this special circumstance.

Federal law is requiring enormous sewer rate increases because it requires local ratepayers to comply with a scientifically unnecessary sewage treatment standard -- full secondary treatment. This policy ignores sound science, ignores regional differences between marine environments, and ignores new and improved technology for treating sewage.

The testimony that you will receive today from the experts - experts like Dr. Mia Tegner from Scripps Institution of Oceanography - will support San Diego's position that the requirement for secondary treatment is overcontrol in certain locations, and in particular, the San Diego Point Loma Outfall.

You will also receive testimony today from other experts - Dr. John Boland and Mr. Bill Eichbaum -- who served on the National Research Council Committee that spent three years considering wastewater management for coastal urban areas at the request of Congress.

If San Diego ratepayers were forced to comply with the secondary treatment standard, sewer rates today would more than double. Capacity charges would rise 81.1%.

The cost of complying with secondary treatment would mean taking another \$1.4 billion in capital from the hard-working men and women of San Diego. During these tough economic times, I believe this would be cruel, unusual and unnecessary punishment.

In 1972, when Congress adopted the secondary treatment requirement, many of the nation's waterways were polluted -- they did not meet the criteria of "fishable" and "swimmable" that

the American people expect -- so the Congress changed the way sewage treatment was regulated and adopted a standard -- secondary treatment -- that would be easy to enforce and would ensure progress towards water quality objectives.

It worked. In the last twenty years, the improvements to our nation's water supplies have been dramatic. There is no question that the Clean Water Act adopted by Congress in 1972 is responsible for the vast improvements in water quality that have taken place throughout the country.

It cost a lot of money to make those improvements -- over \$76 billion -- and 65% of that money came from the federal government. Was it worth it? I think so. Have we, as a country, completed the job? No, we have not.

There are still areas in the country with poor water quality that need to implement higher levels of sewage treatment to protect the environment. Undoubtedly, there may be areas in San Diego which require it. I have supported secondary treatment in northern San Diego County, but it makes no sense at this specific location.

But as you will hear from experts today, San Diego's coastal marine environment at the Point Loma outfall does not require secondary treatment. Science and geography are on our side.

San Diego has an ocean floor that slopes steeply away from the shoreline, accessing deep marine waters within only a few miles offshore. We have an open coast that is a part of the vast expanse of the Pacific Ocean. We have swift currents and dynamic mixing in the waters off Point Loma.

Combined with San Diego's topography is the technology that we have in place to ensure environmental protection. San Diego currently operates a state-of-the-art advanced primary treatment plant that discharges treated wastewater to the Pacific Ocean through a deep ocean outfall. This outfall rests in 220 feet of water over two miles offshore.

The Point Loma Outfall was designed to protect bathing beaches from contamination. It has done so without exception over the past thirty years. When California's State Ocean Plan was amended to protect swimmers at bathing beaches and divers in the offshore kelp beds, San Diego planned the extension of its outfall even farther offshore -- 4.5 miles -- and into deeper waters -- 320 feet below the surface.

This extension, which is currently under construction, will make San Diego's outfall the longest and deepest reinforced concrete structure in the world.

San Diego has monitored the effects of the existing discharge on the marine environment for thirty years and has found that there is no significant impact.

In the EPA's federal court lawsuit against the City in 1991, Federal Judge Rudi Brewster considered a significant amount of evidence presented by the best scientists in the country and found that there is no significant impact.

Judge Brewster's decision reflects his misgivings about the wisdom of proceeding toward an expensive and disruptive secondary treatment construction program when no environmental benefit is achieved.

In his deliberations, Judge Brewster urged the City to contact the Congress to determine if there was an opportunity to rectify this problem through an amendment to the Clean Water Act. I am here to seek that relief.

Earlier this year, the National Research Council, the research arm of the National Academy of Sciences created by the Congress to advise you on policy issues with scientific underpinnings, found that chemically enhanced primary treatment like the City of San Diego provides, is an effective technology for removing suspended solids and associated contaminants.

The NRC also found that long ocean outfalls reduce the need for secondary treatment and that one of the keys to water quality protection is an effective source control system that limits the toxic substances entering the sewerage system in the first place.

The NRC report is one of the best investments Congress has ever made. If implemented by Congress, this report could save ratepayers in San Diego billions of dollars in sewage treatment that the scientists say is environmentally unnecessary at the Point Loma outfall, and for which there are very few federal dollars.

The National Research Council's report clearly shows that we can balance protecting our precious ocean environment with the needs of San Diego's sewage system by setting water and sediment criteria and standards.

Most importantly, it confirms what San Diego has been saying for years: advanced primary treatment is appropriate for San Diego's deep ocean environment at the Point Loma outfall.

This report provides a scientific foundation for Congress to protect the coastal marine environment by amending the Clean Water Act to reflect regional science and geography.

San Diego has chemically enhanced advanced primary treatment. We have a long, deep ocean outfall. We have an effective source control program in place. The science and the scientists say that we don't need secondary treatment at Point Loma to protect our ocean. Chemically advanced primary treatment is enough protection for our deep coastal ocean environment.

The City of San Diego has adopted a program we call the "Consumers Alternative" to secondary treatment which will improve the ocean environment. That program involves a commitment by local ratepayers for \$2.4 billion worth of wastewater improvements that provide more environmental benefit than secondary treatment.

The National Research Council report states that, "With increasing knowledge of environmental engineering and marine sciences, it is now possible to design a waste management system by the water quality and sediment quality-driven approach, namely finding the most cost-effective combination of source control, wastewater treatment, and outfall configuration."

I believe there is no better model than the Point Loma plant for these new standards to be applied.

Today, coastal water-quality standards require exactly the same treatment standard in every location throughout the country.

Isn't it common sense that a wastewater treatment plant like the Point Loma Treatment Plant which discharges treated sewage 4 miles into the ocean should be treated differently than a treatment plant which discharges treated water into a shallow lake or river?

Mr. Chairman, I hope that you and your Committee will recognize the importance of regional differences in the environment as you deliberate upon reauthorizing the Clean Water Act.

I have heard concerns that allowing San Diego to continue with less than secondary treatment may undermine the Clean Water Act that has accomplished so much over the past twenty years to clean up the nation's waters.

I submit to you that forcing San Diego to spend billions of dollars on secondary treatment, just because the law requires it, has a far more detrimental effect on the Clean Water Act. Science should govern how we protect the environment. Isn't that what the Clean Water Program is all about?

I urge you to recognize that regional differences do exist, and different locations require different environmental solutions.

Is there a need to provide additional funding to assist San Diego, Boston and other cities comply with the law? Absolutely.

The lack of federal funding for compliance with federal wastewater treatment standards is also a significant problem for the City of San Diego, and for every community across this country.

It is wrong for the federal government to mandate a \$2.4 billion program upon local ratepayers without paying for these costs. The federal government should restore funding for these massive wastewater programs, particularly if our citizen's rates will be doubled by the federal government to pay for an unnecessary process.

This year, Congress has begun to take steps to restore the Coastal Cities grant program. I applaud those efforts, and encourage members of the Committee to strongly support those efforts.

When Congress adopted the Clean Water Act, Congress also provided the funding for compliance. Now that funding has been removed and EPA is trying to force secondary treatment, San Diego is left holding the bag.

From 1982 to 1987, the Clean Water Act provided funding for 75% of the cost of secondary treatment improvements. The State of California provided a matching amount of 12.5%. The remainder was eligible for state loans. The administration of the Clean Water grants was left to the states, and the California Regional Water Quality Control Board established a priority list of projects to receive funding.

From 1970 to 1986, the City of San Diego received just \$95 per capita in grant funding under the Clean Water Grants program, just 25% of the statewide average of \$383 per capita. San Francisco received \$1696 per capita, nearly four and one-half times the statewide average. Sacramento received \$683 per capita, nearly double the statewide average.

From 1987 to today, the City San Diego has received just \$30 million towards the cost of a \$2.6 billion plan for secondary treatment. Because we met the State Ocean Plan requirements, the City was a low priority for grant funding under the State's Revolving Loan Program.

The State of California's State Revolving Loan Fund doesn't work for the City of San Diego. Why? Because the State of California does not require secondary treatment at the Point Loma outfall, and therefore is not willing to pay for it.

The other serious problem with the State Revolving Loan Fund is a cap of \$20 million maximum per year to the City.

That doesn't help much when we are faced with a \$2.6 billion program for complying with secondary treatment.

It would take 140 years worth of funding from the Fund to pay for the City's capital and interest costs.

Compliance with Title II standards requires an extraordinarily long planning and design procedure which adds 1 full year of delay to funding. Since California uses a priority list to allocate limited funds, delays for projects which are urgently needed can take years.

The State Revolving Loan Fund also has seventeen Title II requirements. Experts within EPA and the State Revolving Fund have estimated that these seventeen requirements add upto 20% to the total cost of a project that starts out at \$2.6 billion.

Our ocean is one of our most valuable resources. We must protect it and the citizens who rely upon it for food, recreation, and their livelihoods. We are protecting it.

We should not be forced to spend billions of dollars on a project that provides no environmental benefit. This country's resources are too scarce. And there are too many other environmental problems that must be addressed.

San Diegans care deeply about our environment and our ocean quality. It is the basis for our life here and our commerce.

We are asking you to allow San Diego ratepayers to save \$1 billion with no reduction in the protection to the environment by reauthorizing the Clean Water Act to allow for this special circumstance.

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FINDINGS IN FEDERAL COURT:
BASED ON SCIENTIFIC TESTIMONY
(1991 and 1992)

- ◆ With the outfall extension in place there is no measurable environmental damage from the existing discharge.
- ◆ The Consent Decree (mandating secondary treatment) should be deferred in the hopes that the parties would take advantage of the opportunity to meet the requirements of the Clean Water Act in a cost-effective and environmentally comprehensive manner.
- ◆ If the City is able to marshal its scientific resources and political will, then the court strongly believes that compelling and meritorious grounds would exist for a waiver application by the City.
- ◆ The findings of the National Research Council should be taken into account and applied to San Diego's situation.
- ◆ It's one thing for the City to put in a \$3 billion program when the Federal Government is paying for it, but it's quite another when the whole thing has to be paid for locally.

FINDINGS BY THE NATIONAL RESEARCH COUNCIL (1993)

About Costs

- ♦ Society can no longer afford to spend large amounts of money solving unimportant problems (p. 61).
- ♦ In order to assure continued public support for environmental protection it is important to make effective use of public funds. If the costs of proposed programs are perceived to be too high or unfairly allocated in relation to the benefits gained, public support will erode and be lost (p. 54).
- ♦ The total, 20-year capital cost to upgrade U.S. municipal sewerage systems is \$110 billion (for the design year of 2010 in 1990 dollars) according to the 1990 Needs Survey Report to Congress (EPA 1991a). The cost for construction of conventional secondary (37.3 billion) and advanced system (11.79 billion) totals \$49.0 billion. A decade ago, the United States government paid about 75 percent of the costs to construct new treatment plants. In 1990, the Federal Construction Grants Program was terminated and replaced with a revolving loan program administered by the states for the EPA. Today, more than 80 percent of the cost burden falls on local rate-payers (p. 243).

About the Clean Water Act

- ♦ Today's coastal water quality management practices are overprotective in some areas (p. 1).
- ♦ The 1972 Clean Water Act has not always allowed a process that adequately addresses regional variations in environmental systems (p. 2).
- ♦ A water quality and sediment quality driven approach rather than a technology based approach should be used to design pollution control systems (p. 8).
- ♦ Because of the wide variations encountered in coastal systems, it is not possible to prescribe a particular technology or approach at the national level that will address all water quality problems (p. 43).
- ♦ Overcontrol is particularly likely along the ocean coasts, where dispersion of partially treated wastes in deep ocean water may produce few, if any, adverse effects. Nevertheless, full secondary treatment is required in every such case, regardless of cost or lack of benefits (p. 124).
- ♦ With increasing knowledge of environmental engineering and marine sciences, it is now possible to design a waste management system by the water-quality and sediment-quality driven approach, namely finding the most cost-effective combination of source control, wastewater treatment, and outfall configuration (p. 183).

About Open Coastal Water

- ♦ Along the west coast a narrow continental shelf and strong currents provide a rapid exchange of water with the ocean (p. 36).
- ♦ Much of the Pacific coastline is straight with deep waters that have open shelf characteristics (p. 39).
- ♦ In case of deep ocean discharge where BOD, pathogens, nitrogen, and other nutrients are of little concern, and contributions of toxics and metals associated with solids are low, treatment for removal of these constituents is unnecessary (p. 49).
- ♦ In open coastal waters oxygen depletion due to biochemical oxygen demand (BOD) from wastewater discharged through a well-designed outfall is not of ecological concern (p. 5).
- ♦ Nutrient enrichment is not known to be a problem along the open Pacific coast (p. 6).
- ♦ During the past 20 years scientific understanding of physical and ecological processes has greatly improved (p. 40).

About Treatment Processes

- ♦ Chemically enhanced primary treatment is an effective technology for removing suspended solids and associated contaminants (p. 8).
- ♦ Secondary or other treatment implemented solely for BOD removal produces little improvement in receiving water quality (p. 7).
- ♦ Long outfalls with high initial dilution generally reduce the need for secondary treatment (p. 102).
- ♦ Over the past decade it has become clear that the best approach to pollution control is pollution prevention wherever possible (p. 44).

NATIONAL RESEARCH COUNCIL REPORT RECOMMENDATIONS:

1. Coastal wastewater and stormwater management strategies should be tailored to the characteristics, values, and uses of the particular receiving environment based on a determination of what combination of control measures can effectively achieve water and sediment quality objectives.

The City of San Diego currently combines an effective industrial pretreatment program, state-of-the-art advanced primary treatment, and an ocean outfall that is being extended to make it one of the longest and deepest in the world. The high rate of mixing in the open coastal waters offshore and enormous amount of oxygen available as a result of that mixing, keep oxygen depletion due to biological oxygen demand (BOD) from being a problem.

2. Greater attention should be focused on preventing excess regional enrichment of nitrogen and other nutrients at levels that are harmful to ecosystems.

This recommendation is not pertinent to well-mixed open coastal waters such as those offshore of San Diego. Nevertheless, it should be noted that secondary treatment does not remove significant amounts of nutrients such as nitrogen from wastewater.

3. Source control of pollutants should be strongly encouraged by incentives and regulation.

The City of San Diego has an excellent industrial pretreatment program in place to ensure that pollutants never enter the sewerage system. It is a tribute to this pretreatment program that the sludge removed from the wastewater is given the cleanest designation under the latest EPA regulations. As a result of this high quality 100% of San Diego's sludge is put to beneficial use.

4. Coastal municipal wastewater treatment requirements should be established through an integrated process on the basis of environmental quality as described, for example, by water and sediment quality criteria and standards, rather than by technology-based regulations.

The State of California currently has water quality-based standards for marine waters. Those standards are set forth in the State Ocean Plan. The City of San Diego meets or exceeds all Ocean Plan requirements with the exception of the bacteriological limit in kelp beds. That limit will be met upon extension of the ocean outfall pipe, currently under construction. The NRC report states that "where BOD is not an issue, chemically-assisted primary treatment is an effective means of removing suspended solids and associated contaminants."

5. Stormwater and combined sewer overflow abatement requirements should be based to the greatest extent possible on an understanding of regional and local hydrology and coastal oceanography. They should be designed in conjunction with other regional environmental protection programs to produce the most cost-effective program for achieving the desired level of protection for receiving waters.

San Diego is fortunate to have a separate storm and sewer system, unlike many of the nation's older cities.

6. The EPA, public health agencies, and wastewater treatment agencies should vigorously pursue the development and implementation of techniques appropriate for routine monitoring to measure more directly the presence of pathogens, particularly in marine and estuarine waters.

San Diego has led the way in collecting and analyzing water samples using a better indicator of pathogens, enterococcus bacteria. Over the past several years San Diego has voluntarily carried out these studies to provide comparative data to scientific and regulatory groups.

7. Management systems should be flexible so that they may be changed as needed to respond to new information about environmental quality and the performance of existing management systems.

San Diego supports flexibility in the management of water quality to ensure that neither overcontrol nor undercontrol takes place.

8. Wastewater and stormwater management and other protection strategies for coastal urban areas should be developed and implemented within a system of integrated coastal management (ICM). ICM is an ecologically based, iterative process for identifying and implementing, at the regional scale, environmental objectives and cost-effective strategies for achieving them.

San Diego supports the proposed system of integrated coastal management and looks forward to participating with other agencies in its implementation.

June 1993

HISTORY OF REQUESTS FOR LEGISLATIVE CHANGE BY CITY OF SAN DIEGO

- 1972: Clean Water Act ("Act") requires secondary treatment of all municipal wastewater dischargers by July 1, 1977.
- 12/27/77: Congress enacts Section 301(h) to Act permitting waivers of secondary treatment for certain ocean dischargers.
- 9/20/78: City submits preliminary waiver application based on the Environmental Protection Agency's ("EPA") proposed regulations.
- 8/31/79: City files waiver application based on EPA's final regulations.
- 5/15/80: State Water Resources Control Board assigns very low priority to secondary treatment facilities for the award of federal grant money in favor of funding for California Ocean Plan projects.
- 9/23/81: EPA tentatively approves City's waiver application.
- 11/23/83: City submits revised waiver application to include updated population projections and to account for Tijuana sewage treatment.
- 9/30/86: EPA reverses tentative approval of the 1979 waiver application and tentatively denies both the City's 1979 and 1983 applications.
- 12/86: Mayor of San Diego meets with EPA Region IX and the Regional Water Quality Control Board ("RWQCB") and is told that the City would never obtain a waiver, no new waivers would be approved, and federal and state funding would be made available to the City for the expenses associated with secondary treatment.
- 2/17/87: City discontinues waiver efforts partially on the basis of the EPA and RWQCB's representations made to the Mayor in 1986.
- 7/27/87: RWQCB issues Cease and Desist Order 87-113 for noncompliance with the secondary treatment requirements of the Clean Water Act.
- 7/27/88: United States and State of California file suit against City for alleged violations of the Clean Water Act.
- 1/30/90: Plaintiffs and Defendant enter into a partial Consent Decree, which requires the construction of secondary treatment facilities (seven reclamation plants, one new secondary treatment plant and upgrade of Point Loma Wastewater Treatment Plant).

- 2/21/90: District Court ("Court") finds that Consent Decree is consistent with the Clean Water Act and sets the liability and penalty phase of the trial for 2/5/91.
- 11/1/90: Court expresses concern over cost of secondary treatment upgrade in return for no increase in environmental protection. Court orders hearing (to be held in conjunction with liability and penalty trial) to determine whether discharges from San Diego wastewater treatment system have significantly and adversely impacted the marine environment. Court expresses willingness to stay entry of Consent Decree pending exhaustion of City efforts to reactivate its § 301(h) waiver or obtain legislative relief.
- 3/28/91: After an eight week trial, Judge Rudi Brewster, United States District Court for the Southern District of California (United States, et al. v. City of San Diego, Case No. 88-1101-8) issues Memorandum Decision (amended on 4/18/91). Judge Brewster found that the discharges did not present a significant adverse impact to the marine community in the vicinity of the outfall.
- 3/28/91: Judge Brewster expressed concern about high bacteria counts in the kelp beds inshore of the discharge. The risk to divers associated with the elevated bacteria levels in the kelp bed and the suspected impact of the discharge on the beds themselves will be eliminated in 1994 upon completion of the outfall extension at a cost of about \$60 million.
- 3/28/91: In assessing a penalty, the Court considers as mitigating factors the lack of environmental harm to the sediment, and with respect to delays in implementing secondary treatment, the contradictory and inconsistent signals sent to the City by both state and federal governments during the City's efforts to comply with the secondary treatment requirements of the Act (Amended Memorandum Decision at 7, 10-13). The Court assesses City a penalty of \$3 million: \$500,000 payable to the U.S. Treasury upon entry of judgment; \$2.5 million waived if City enacts a water conservation credit project as specified (Amended Memorandum Decision at 14-17).
- 3/28/91: The Court's decision not to defer consideration of the Consent Decree is without prejudice to the City's attempting to obtain a waiver while the Consent Decree is being considered or during the implementation of this or any other amended Consent Decree (Amended Memorandum Decision at 5, n. 3.).

- 6/18/91: At the conclusion of a hearing to consider whether the Consent Decree is in the public interest, the Court states that compelling and meritorious grounds exist for a waiver application by the City if the City pursues treatment improvements and conservation advancements as specified. To allow the City time to achieve these objectives, the Court finds that deferring approval of the Consent Decree would best serve the public interest (Memorandum Decision Deferring Approval of Proposed Partial Consent Decree at 8.)
- 8/30/91: The Governance Advisory Group, comprised of the fourteen member agencies of the Metropolitan Sewerage System and the County Water Authority, votes unanimously to recommend that San Diego pursue legislative changes to provide relief for the Point Loma Treatment Plant.
- 9/9/91: San Diego City Council authorizes the City Manager to pursue legislative changes to provide relief for the Point Loma Treatment Plant.
- 4/21/92: A rate case and bond issuance to support the program is considered by City Council. The cost of the reclamation-based secondary treatment program is \$2.5 billion. These costs will be borne almost entirely by San Diego ratepayers and will cause rates to double by the year 2000.
- 5/26/92: San Diego City Council directs the City Manager to seek modification of the Consent Decree based on the Consumers' Alternative, an upgrade of the sewerage system based on an advanced primary treatment plant at Point Loma.
- 7/10/92: Judge Rudi Brewster grants the City's request to proceed with the Consumers' Alternative and to stay all other Consent Decree dates for nineteen months pending a hearing on modification of the Consent Decree.
- 8/28/92: Judge Brewster reaffirms his July 10, 1992 decision.
- 11/12/92: Department of Justice and EPA file a Notice of Intent to Appeal. Hearing is scheduled for October 1993.
- 12/21/92: Department of Justice files a Writ of Mandamus, a request for an order to compel Judge Brewster to either enter or reject the Consent Decree. Request is rejected.
- 8/6/93: Next status conference with Judge Brewster.

STATEMENT OF JEFFERY D. FRAUTSCHY
2625 Ellentown Road
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Presented in brief to the
San Diego City Council
December 9, 1986

Ladies and Gentlemen of the Council:

My name is Jeffery D. Frautschy. I have been interested and involved in water quality matters for a long time. In 1982 I retired from service at the Scripps Institution of Oceanography as Deputy Director. I had been employed in marine science there for 40 years. During this time, there were periods of time when I was on the advisory board of the systemwide Water Resources Center at Davis and when I was an Associate Director of the systemwide Institute of Marine Resources. I have also served terms as a commissioner of the Governor's Commission on California's Changing Environment, on the Regional and State Coastal Commissions, and as a member of the San Diego Regional Quality Control Board. I participated in the field studies that led to construction of the Pt. Loma plant. In recent years, I managed the California Sea Grant Program - a more than \$3 million a year research and public education program dedicated to wise conservative use of marine resources. The University of California system, the State University system, and private universities like Stanford and Cal. Tech. all participated in this program.

Recently the City of San Diego's practice of discharging sewage effluent treated to the advanced primary level has been criticized by some citizen groups, the local press, and electronic media commentators.

What is not recognized is that this discharge is receiving the correct level of treatment. This has resulted in significant net benefit to the marine biota. Unfortunately the "wastewater disposal problem" has been so cherished, colonized, and institutionalized that we only hear horror stories largely related to past practices elsewhere, misinformation resulting from lack of understanding of fundamental differences between the open coastal marine biota and the biota of confined bodies of water and generalizations about residual problems. Never do we hear of benefits.

Responsible European fisheries biologists now ascribe the doubling of fish production from the North Sea during the period 1955-1975 to increased sewage flows from the cities of Northern Europe.

Unfortunately EPA has decided that there will be a single standard of wastewater treatment for wastes to be discharged into either freshwater or ocean water. Even more unfortunately, this standard is inappropriate environmentally for deep water open ocean discharges like San Diego's and cannot be justified on the basis of environmental benefits or public health benefits. The single standard of secondary treatment was established for the administrative convenience of EPA and to establish equality of regulatory treatment - important considerations for bureaucrats.

Very major differences exist between freshwater and marine biota. The biomass of the oceans is dominated by very small (often microscopic) plants and animals. Many of the small animal forms are the juveniles of larger species and bear little resemblance to the adult forms. The ocean world is dominated by juveniles. Most of them feed opportunistically on small particulate organic material. Most marine plants are very small and rather primitive. They derive their basic nutrition from simple nutrient compounds dissolved in sea water. Most of the food for these animals and the nutrients for the plants ultimately have come from land (some are recirculated by upwelling). This is why most of the productivity of the ocean is in coastal waters and the deep ocean is a desert. Oxygen is in plentiful supply in most open ocean waters and is rapidly replenished.

Secondary treatment is a process in which a favorable environment is maintained in the treatment plant for bacteria to propagate and feed on the waste materials. The residual materials left are mostly oxidized particulate material (which can be thought of as "ash") and simple dissolved compounds which can serve as plant nutrients. These simple nutrients are sometimes referred to as "mineralized compounds." What is left does not extract much oxygen from the water (at least in the short-term). It also has no food value for animals since the bacterial action has already extracted the available energy by oxidation. Since the treatment process depends upon thriving bacteria, the introduction of sewage containing biocides stops the process and the plant is said to suffer an upset. The sewage then goes through virtually untreated. Further, the oxidation process renders some toxic materials in sewage, notably mercury and chromium, thousands or even millions of times as toxic as they were in the common reduced state.

In spite of these shortcomings, it is rational to require secondary treatment of wastes to be discharged to fresh water or sea water in confined bays or estuaries where availability of oxygen can be a problem.

Considering the environmental rather than regulatory considerations, it appears difficult to defend a secondary standard for a situation like San Diego's and impossible if economics enter the picture. Microscopic and very small marine animals in the sea, underfed in most circumstances, would not benefit from the effluent since bacteria in the plant would have oxidized (or removed the available food energy) from most of it. True, oxygen would not be demanded from the ocean water but this is of no consequence since it would be rapidly replenished. Nevertheless, EPA is concerned about the oxygen since it is very important in fresh water.

A contractor retained by EPA has faulted the existing discharge on the grounds that in a bottom area in the vicinity of the discharge brittle stars are diminished in numbers and there are now more of another bottom dwelling species present. In effect, EPA is saying, "feed the birds, but don't attract kinds of birds not already present." This is to my mind not a very brilliant protective strategy. Put out oats, you get sparrows; put out pyrocantha berries and you get cedar-waxwings. The ocean is a vast open system with myriad juvenile forms, some of which will take advantage of any available food. What EPA says is "introduce effluent but don't cause any changes to a balance of populations that existed prior to this introduction of animal food and plant nutrients. Balanced indigenous populations may exist in the land or freshwater environments. If they exist in the ocean at all they are evanescent.

Conversion of sewage treatment from advanced primary to secondary has no real public health implications, positive or negative. Advanced primary treatment is as effective in reducing bacterial and viral pathogens as secondary treatment. Secondary effluent discharged through the Pt. Loma diffuser would not solve nor improve the compliance problem that San Diego has along the western margin of the Pt. Loma kelp bed. Moving the discharge sufficiently far away from the kelp bed would.

San Diego has several real and identifiable waste water problems and opportunities:

1. Bacteria counts at depth in the vicinity of the western margin of the Pt. Loma kelp bed are too high. Secondary treatment will do nothing to solve this problem. Exploring the feasibility of extending the outfall seaward sufficiently far is a necessary first step if Pt. Loma is to stay in service as a primary or secondary plant.

2. The city should continue to explore sound methods for reclaiming waste water for reuse. Pumping product water to reuse loci is a significant fraction of the cost. It appears that reclamation should take place at disseminated plants at elevations near the elevations of

places where product water will be reused. A new major secondary plant near sea level will not contribute to reclamation. Part of the capital costs of a secondary plant would be better spent in establishing some disseminated reclamation plants where water could be used for irrigation - near freeways or major parks, for example.

3. With continuing growth of the city, an additional coastal treatment plant and ocean discharge site needs to be identified and protected for future use. For many years, the use of reclaimed water will be seasonal and a coastal backup plant will be a necessity.

4. While the city has a good program to keep industrial toxins out of the sewer system, there is always room for improvement. A continuing public education program to keep household toxins out of the ocean is also important. Introduction of persistent toxins into the ocean with waste water is the biggest and only real threat to the ocean environment. Secondary treatment will not ameliorate this threat. It is unlikely that any economically feasible treatment will remove very small quantities of many kinds of toxins from enormous quantities of waste water. Ten percent of the operating costs of a secondary plant spent on keeping toxins from getting into the sewer system will accomplish far more for the ocean environment than secondary treatment.

5. San Diego's biggest ocean discharge problem is EPA's bullheaded pursuit of a single discharge standard, flaunting the intent of Congress which established the 301(h) waiver procedure permitting exceptions from EPA's single standard when environmentally appropriate.

Testimony by the late John D. Isaacs of the Scripps Institution of Oceanography was particularly effective in influencing Congress to provide for the 301(h) waiver and was directly applicable to San Diego's discharge. The record of the hearing fills some 380 printed pages, and I urge that you become familiar with it before you make a decision. I know that you are busy but so were the Congressmen considering the matter. The local press should also be encouraged to educate themselves in this regard so that more enlightened views will be printed. If one believes that EPA discharge regulations are based on sound scientific principles, he is sadly deluded.

Isaacs, a member of both the National Academy of Science and the National Academy of Engineers, headed the Marine Life Research Program, a multi-million dollar continuing investigation of life and the California Current system, and the systemwide University of California Institute of Marine Resources. He was qualified to express the positions that he took. He frequently urged that coastal cities build pyramids rather than secondary treatment plants. They would do as much good environmentally and would be more interesting.

If you opt to vote for construction of a secondary plant here in San Diego, do so knowing that:

1. The plant will not improve the ocean environment. In fact, it will probably detract from it. Primitive plants will flourish at the expense of important near-microscopic marine animals in the water column. Food which would have been available to support large animal populations will have been consumed by bacteria in the plant with the production of by-product nutrients for plants and virtually inert particulate material.

2. Money which could have been well spent to keep toxic materials out of sewage will be unsuccessfully used to attempt to remove small amounts of toxins from oceans of water.

3. Counts of pathogen indicators, as well as pathogens, will be as high in the secondary effluent as in advanced primary effluent. There is no perceptible public health advantage of secondary treatment.

4. You will have committed a large amount of city money (and possibly Federal) to build a large secondary plant at a new and as yet unidentified near coastal site as well as a new ocean outfall. The new plant will cost much more to operate than the Pt. Loma plant.

5. And, apparently very important - EPA will be off your back for awhile!

Point 5 makes the secondary option sound too attractive. Remember the capital cost, the marginal or nonexistent benefits of secondary treatment, and how voters will react when they get their water bills with new sewer charges. Each of them will acquire a new debt of something like \$1,000 because of this decision.

You of the Council should know that if you choose to fight for a 301(h) waiver, you are not trying to shortchange the environment by taking the cheap way out. You are making an environmentally sound decision, dealing with the real ocean rather than one imagined by EPA. Also that the Congress intended that in situations like this a waiver should be granted.

In my opinion, I believe that it is almost impossible to get a waiver without Congressional intervention. EPA does not want to deal with exceptions, nor facts. The agency will mend its ways only if threatened by Congressional action.

Statement before the Public Services and Safety Committee of the San Diego City Council, June 21, 1989.

Subject: Wastewater disposal facilities for the San Diego Metropolitan Sewerage District.

My name is Elmer Keen. I am a professor of geography at San Diego State University where my main teaching and research interest is the management and use of marine resources. I also chair the Water Committee of Citizens Coordinate for Century 3, a position that I assumed primarily because of my concern over the subject of this presentation.

My interest in San Diego's wastewater disposal system began in 1967 when I first taught an undergraduate course at SDSU entitled the Geography of Marine Resources. The course is a broad treatment of marine resources that covers both physical and human aspects of use of the oceans and its resources. The problems associated with sewage disposal in San Diego Bay and the subsequent construction of the Point Loma plant provided a good example of this resource aspect. Therefore, I developed some lectures on the subject and have used San Diego as an example ever since. I have also used it as a topic in a graduate seminar on natural resources management that I occasionally teach.

As a consequence of my teaching, I have kept up over the years with the literature published both on the subject of waste disposal in general and specifically in reference to the San Diego situation. This included the requirements of the 1972 amendments to the Clean Water Act, the 1977 amendments permitting a waiver for ocean disposal, input of San Diegans into the waiver amendments, and subsequent applications for a waiver.

The decision of the City Council on February 17, 1987 to withdraw the City's application for a waiver came as a complete surprise to me. The literature on use of the oceans in the U. S. left no doubt that EPA should deny Boston a waiver to permit its continued use of Boston harbor for sewage disposal. The literature also contained some doubts as to the desirability for continued dumping of New York's sewage sludge 12 miles off that city. One could also understand why EPA wanted uniform laws for the entire country when faced with pressure from the Congressional delegations of those two powerful states. But nothing in the literature suggested that the Southern California Bight could not satisfactorily handle even the massive flows from sewage plants in the Los Angeles area with primary treatment only. The San Diego City Council's action had to be based on reasons other than hard data showing unacceptable impacts on the marine environment.

In recent years, my research interest has turned to institutional arrangements for management of marine resources,

and at the time of the Council's decision, I was just finishing a short book on arrangements for management of marine fishery resources. Needing a change of research topics, I decided that my next major one would be institutional arrangements affecting use of the oceans for waste disposal. One focus of the research was to be why the San Diego City Council decided to withdraw the waiver application. Time does not permit presentation of my findings to date nor are they especially relevant to this hearing. However, my research has required that I read widely on the problems of disposal of municipal wastewater and its products.

Among the more useful studies that I researched concern multi-media, also referred to as cross-media, disposal of wastewater products. These studies, in the best of environmental impact assessment methodology, compare all options of disposal in the different media--land surface and subsurface areas, fresh and salt waters, and the atmosphere. The logical conclusion of such studies is that disposal be made in the medium of least total adverse impact or divided among media in a way that creates the least impact.

Possibly the most comprehensive cross-media study done on a wastewater product was that funded by New York City to support its application for an ocean sludge disposal permit. The alternatives to ocean disposal considered were landfilling, deep-well injection, spreading of processed sludge over open ground, recycling for reuse in various forms, and storage. All alternatives except incineration were rejected as being impractical for New York City. The final comparison of incineration and ocean disposal showed that on a scale of risk estimates developed for the study, incineration rated 94 points, ocean disposal only 5.3 points. The conclusion was reached that neither option could be rejected on environmental grounds although the ocean disposal option was clearly preferable.¹

No comprehensive multimedia assessment has yet been made of the Clean Water Program proposals for secondary treatment facilities for San Diego. Nor is it at present certain that the final EIS will include a full assessment of environmental costs of the "no project" option required by the National Environmental Policy Act. Available data leave little doubt, however, that the environmental impact will be at least as disparate between primary and secondary treatment as was sludge incineration and

1. James J. Gitt, et al. 1989. "Incineration Versus Ocean Disposal of Sewage Sludge: A Multimedia Assessment of New York City Management Options," in Oceanic Processes in Marine Pollution: Volume 3, Marine Waste Management: Science and Policy. Edited by Michael A. Champ and P. Kilho Park. Malabar, Florida: Robert E. Krieger Publishing Company, 1989, pp297-313.

ocean disposal in the New York City assessment.

Marine scientists testifying at this hearing and elsewhere have described the environmental impacts of discharge of primary effluent from San Diego's sewage system as trivial at present and likely to remain so into the foreseeable future. Their conclusions are based on detailed studies of the Pt. Loma outfall impacts as well as knowledge of the oceans in general. Major impacts are limited to the zone of initial dilution (ZID) where the ecosystem unquestionably has been highly modified. As defined by Tectra Tech, the company engaged by EPA to evaluate San Diego's application for a Clean Water Act waiver, this zone totals a little less than 33 acres in area lying along the diffuser portions of the outfall. Effluent effects on the biota falls off rapidly from the ZID. Whether these effects are adverse or not appears largely to be a question of personal values. All ecosystem impacts from the effluent would be reversed within a few years if the system were abandoned. Whether possible health effects on SCUBA divers in the kelp beds, also cited by EPA as a reason for denial, can be taken care of by a change to secondary treatment appear problematical. In any event, possible adverse health effects can be removed at lower environmental and economic costs by other means.

Studies as to the land and atmospheric environmental costs of handling San Diego's present wastewater stream with secondary treatment are not as available as for oceanic impacts. Without question, the environmental costs on land would be higher. Secondary treatment plants require substantially more land than do primary treatment plants. The biotic community on this land would be completely eliminated, not just highly modified as in the ZID. Reversal of the impact, quite obviously, would be far more difficult. Secondary treatment produces approximately double the sludge per unit of effluent as does primary treatment. Removal of water from secondary sludge is somewhat more difficult than from primary sludge. The drying beds on Fiesta Island that handle the present sludge production are 50 acres in size. Presumably the land area needed if air drying of secondary sludge is used would be twice as large. Again, the "natural" biotic community would be completely eliminated although reversal should be easier than with the secondary treatment plant site.

Removal of the dried sludge to its final resting place would require double the number of truck trips as at present with attendant impacts on both land and atmospheric resources. Much of the sludge from Fiesta Island presently is used by a sod grower in the Tijuana River Valley. Whether double the amount could be so used is questionable. Also questionable is whether its use for sod would be more beneficial to humans than the higher production of fish resulting from placement of nutrients it contains into the ocean. More stringent controls being considered by EPA for use of sludge as a soil amendment may require placement of the sludge in a landfill. Should this

happen, the land area required would be at least as large as the ZID of the Pt. Loma outfall. The natural ecosystem of the land used would, as with the land requirements of secondary treatment facilities discussed above, be changed completely.

Adverse atmospheric impacts of secondary treatment would be substantially larger than are those of the present primary treatment of the region's wastewater. Fortunately, land remains for landfill in the San Diego region although competition for it is becoming severe. Thus the greater environmental impacts that New York City must face in disposing of sludge by incineration will not be necessary, at least in the near future, for San Diego. However, secondary treatment and handling of the increased volume of sludge does require substantially larger amounts of energy than does primary treatment. Air pollution will increase to the extent that fossil fuels are used to generate this power. Also, some gases that enter the atmosphere are generated in the activated sludge process used in secondary treatment and through decay of the sludge that results. While probably not large enough to have a significant adverse impact, the net result is certain to be greater than if the wastewater were discharged to the ocean as primary effluent.

To summarize, the relation between environmental costs for primary and secondary treatment of San Diego's wastewater seems to be roughly of the same order as between incineration and ocean disposal of New York City's sludge. More specifically, the environmental costs of secondary will be between one and two orders of magnitude greater than for primary treatment. In absolute terms, this by no means suggests that environmental costs of secondary treatment are prohibitively high. They are not; to turn to secondary is not going to irreparably and unacceptably degrade San Diego's natural environment.

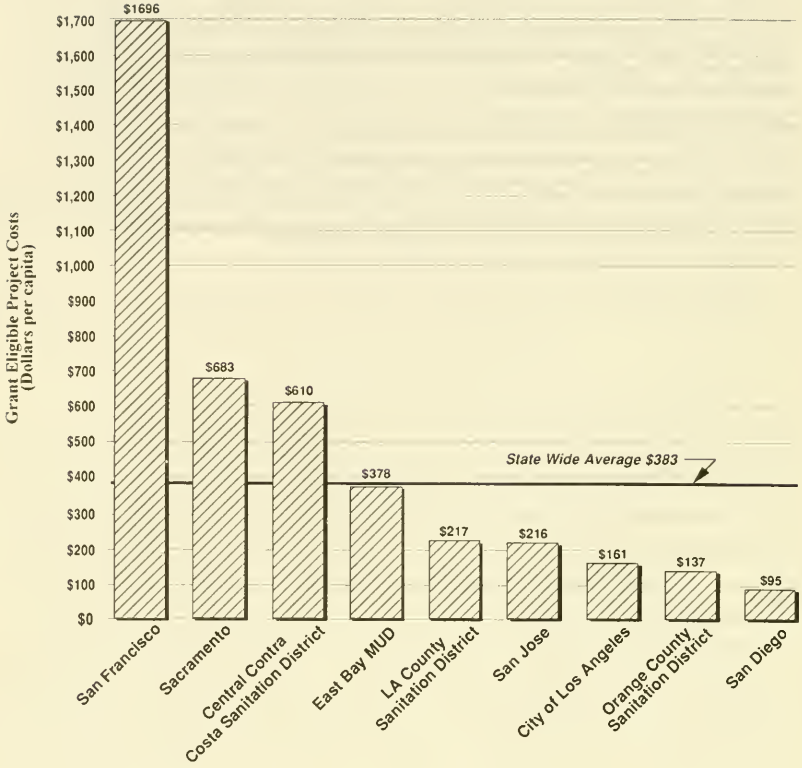
Rather, the usefulness of the comparison of environmental costs is the emphasis given to the small impact that primary effluent has on the marine environment. On the scale for risk estimates between sludge disposal alternatives used in the New York study, ocean disposal rated 5.3, incineration 94. On the same scale, primary treatment in San Diego would be at worst a 1.0. If secondary were ten or twenty times that, it would still not do much harm to terrestrial or atmospheric resources.

The reasons given by EPA for its proposed rejection of the waiver were environmental costs. These costs are, as brought out by the marine scientists from Scripps, trivial--substantially more trivial than the environmental costs of secondary treatment. The reckoning of environmental costs favors retention of primary treatment, but the absolute difference is not of much consequence. The real issue lies the difference in economic costs.

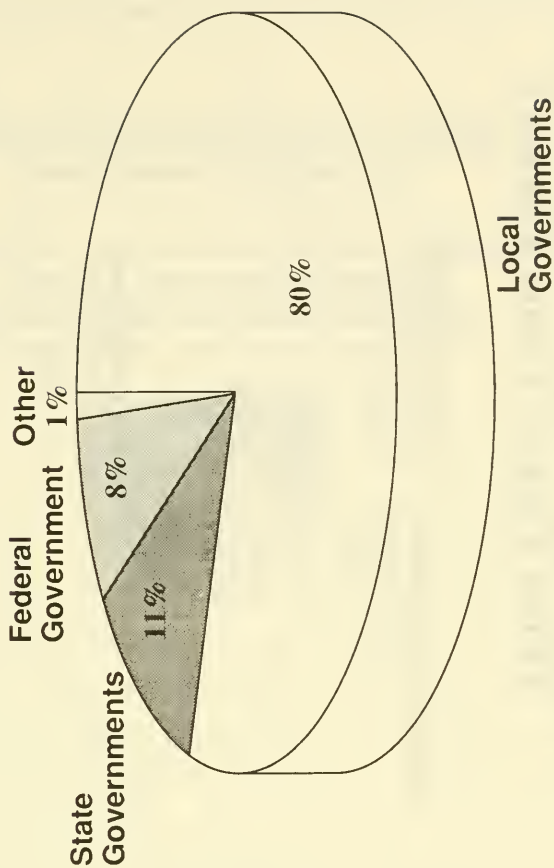
Mark Sagoff, a philosopher who has written widely on philosophy and environmental problems, states in a recent book, "Policymakers need to know which beliefs about facts are credible and which arguments about values are sound. The credibility of a belief (e.g., that the earth is round) depends on evidence and expert opinion, not the amount people are willing to bet that it is true."² My main preliminary conclusion as to why EPA is requiring cities on the Southern California Bight to invest in secondary treatment, and as to why the San Diego City Council made its decision of February 17, 1987, is that both accepted arguments based on values not supported by credible facts. Hospital wastes on the beach and sewer main breaks that pollute Mission Bay are not part of the primary/secondary treatment issue. If we can separate the facts on events such as these that affect the ocean, chances are good that decisions can be reversed and San Diego can avoid a project that can be justified by neither environmental nor economic costs.

2. Mark Sagoff. 1988. The Economy of the Earth. Cambridge University Press. p. 37.

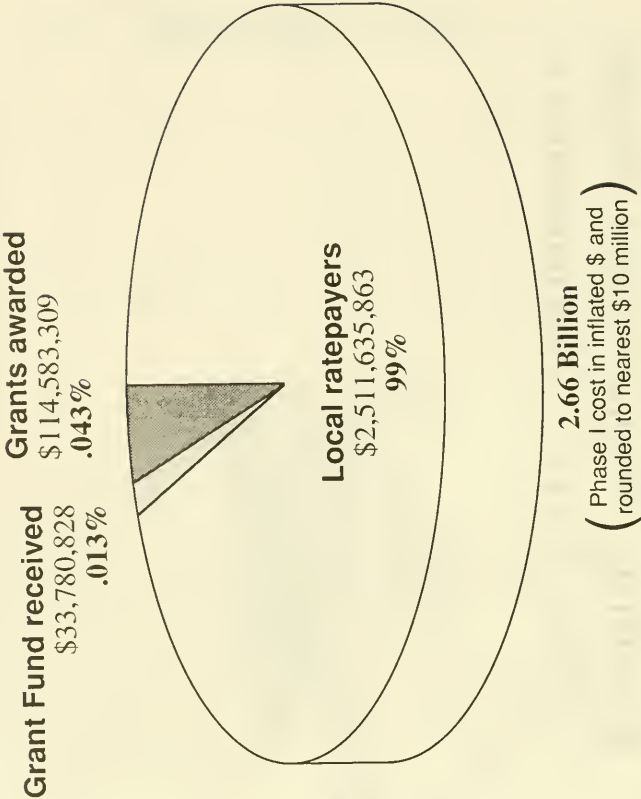
Clean Water Grants Program (1970 - 1986)



Funding Wastewater Needs: Who Pays? (Nationwide)



Funding Wastewater Needs: Who Pays? (San Diego)



Testimony of Honorable Valerie Stallings
Councilmember, City of San Diego

Subcommittee on Environment and Natural Resources
of the U. S. House of Representatives
Committee on Merchant Marine and Fisheries
Field Hearing on the Clean Water Act



July 8, 1993

*STATEMENT OF HONORABLE VALERIE STALLINGS, COUNCILMEMBER**CITY OF SAN DIEGO**SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES**HEARING ON THE CLEAN WATER ACT**JULY 8, 1993*

Mr. Chairman and Members of the Subcommittee, I am Valerie Stallings, San Diego Councilmember from the Sixth District. Prior to being elected to office, I was a researcher at Salk Institute for over 20 years. As a member of San Diego's City Council, I am responsible for working with my colleagues -- and yours -- to ensure that our city has a sewage treatment system that protects the environment and protects our ratepayers' pocketbooks. With my scientific background, I am perhaps more knowledgeable than most politicians about the technical issues associated with the reauthorization of the Clean Water Act.

I understand that at a hearing last week, Congressman Norm Mineta stated that the Clean Water Act should not only have the goals of making our nation's waters swimmable and fishable, but also the goal of being "do-able". I believe he was talking about dollars and cents! Today I will testify about two things: the science -- with my scientific hat on -- and, with my councilmember hat on -- the costs.

When the Act was drafted in 1972, there were significant problems in many areas of the country. They needed to be addressed quickly. So secondary treatment was included as a black-and-white standard, one that would be easy to enforce, and federal and state construction grants to the tune of up to 90% of the costs of the projects were included as the incentive -- the money to make it "do-able". Did it work? Yes, it did. The clean waters of this country are a tribute to the elected officials who enacted it.

But that was over twenty years ago -- about the time that I started at the Salk Institute. And just as there has been dramatic progress in the world of medicine and research at Salk,

there has also been dramatic progress in environmental engineering and marine science that can, if we choose to use it, benefit coastal communities.

Ocean outfalls have gotten longer and deeper. Primary treatment processes have been improved to remove more of the suspended solids. Source control programs have been markedly improved. Marine monitoring programs that provide us with the vital feedback that we as decision-makers need have become far more sophisticated over the past two decades.

First: ocean outfalls. The extension of San Diego's outfall that is currently under construction and will provide 300 to 1 dilution, making it one of the most effective outfalls in the world. In addition, San Diego has under design an undersea tunnel, a first for the West Coast and only the second for the country - following in the footsteps of your Boston Harbor tunnel, Mr. Chairman.

Second: treatment processes. San Diego currently uses chemically-enhanced primary treatment. Our plant, which went into operation in 1963, received an award from the Federal Water Quality Administration, the precursor to the EPA, for building a state-of-the-art plant that effectively cleaned up coastal pollution. Since then San Diego has improved the plant by using chemical enhancement to remove 75-80% of suspended solids. Removal of suspended solids is important to ensure that toxics -- pesticides and heavy metals, for example -- stay out of the ocean. At our treatment plant we meet all secondary treatment criteria for toxics -- with our advanced primary processes.

Third: source control -- that's where the greatest improvement in wastewater quality enters the picture. San Diego's theme for sewage treatment is that the treatment plant -- ironically -- shouldn't be the place we rely on for ensuring protection of the ocean. We don't want to depend on the treatment plant to remove the toxics -- we don't want them to get into the system in the first place. It is a tribute to the effectiveness of San Diego's industrial

pretreatment program that today 100% of our sludge can be beneficially reused -- and that's because we have such a high quality sludge.

In addition to the advances in engineering, we have three decades of ocean monitoring data in hand. This kind of information is the envy of the scientific world because it is very unusual to have so much long-term data. As a result, we have all the facts any scientist needs to demonstrate that the existing discharge is protecting our ocean.

And finally, costs. Our ratepayers in San Diego have been patient. They have supported improvements to the sewage system with their pocketbooks. They have paid \$100 million to build an interceptor ring around Mission Bay to protect it from sewage spills. They have paid \$60 million to extend the outfall to protect divers in the kelp bed. They are paying \$200 million for a new water reclamation plant to supplement the potable water supply. They are paying over \$300 million for new sludge processing facilities. These things add up. But they are worth it.

Secondary treatment - at a cost of \$1 billion in capital and another \$1.7 billion in financing costs - isn't.

I understand the fears of opening up a Pandora's box; indeed, we do need to be careful. But we mustn't be afraid of change when change means progress.

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WHAT MAKES SENSE FOR SAN DIEGO?

POINT LOMA PROTECTS THE ENVIRONMENT AT ADVANCED PRIMARY

—Extensive Monitoring Records - over 30 year period

- Water column
- Sediments
- Bottom-dwelling organisms
- Fish

—Testimony of Scientists from Scripps Institution of Oceanography

—Research on Impacts of February 1992 Outfall Break

SAN DIEGO IS DEDICATED TO PROTECTING THE ENVIRONMENT:

—Water Reclamation

- Goes far beyond requirements of Clean Water Act
- Provides a valuable resource to an arid region
- Reduces inputs to ocean

—Extension of Point Loma Outfall

- Protects all recreational waters
- Avoids use of chlorine
- Cost: \$60 million
- Complete by 1994

—Effective Pretreatment Program/Limited Industrial Activity

- "Clean" sludge for beneficial uses
- Protects ocean

NATIONAL RESEARCH COUNCIL REPORT
ON
WASTEWATER TREATMENT FOR URBAN COASTAL AREAS

April 1993

Why is this Report So Important to San Diego?

1. The Clean Water Act currently requires all municipalities to treat their wastewater to at least secondary treatment levels.

THIS REPORT CONCLUDES THAT THE USE OF TECHNOLOGY-BASED STANDARDS CAN LEAD TO EITHER OVERCONTROL OR UNDERCONTROL. IN SAN DIEGO'S CASE 30 YEARS OF CAREFUL MONITORING OF THE MARINE WATERS SURROUNDING THE DISCHARGE OF PRIMARY OR ADVANCED PRIMARY TREATED EFFLUENT DEMONSTRATE THAT SECONDARY TREATMENT IS NOT NEEDED TO PROTECT THE ENVIRONMENT--THAT IT WOULD BE COSTLY OVERCONTROL THAT WOULD NOT BENEFIT THE OCEAN.

2. Secondary treatment is defined as the removal of at least 85% of the suspended solids and Biological Oxygen Demand (BOD) from sewage. BOD is an important parameter in lakes, streams, and rivers, because it reduces the already limited amount of oxygen that is needed for fish and other aquatic animals to flourish.

THIS REPORT CONCLUDES THAT BOD IS NOT AN IMPORTANT PARAMETER FOR OPEN COASTAL WATERS SUCH AS THE ONES OFF POINT LOMA. THE OCEAN IS MUCH LARGER AND BETTER MIXED THAN INLAND WATERS. OXYGEN LEVELS ARE RARELY A PROBLEM.

3. Ocean outfalls on the West Coast convey treated effluent away from beaches and recreational areas and into deep offshore waters. In San Diego's case, the existing outfall discharges 2.5 miles offshore in 220 feet of water; the extension of the outfall that is due to be completed within a year will discharge 4.5 miles offshore in 320 feet of water, making it one of the longest and deepest outfalls in the world.

THIS REPORT CONCLUDES THAT OCEAN OUTFALLS SHOULD BE CONSIDERED AS PART OF THE TREATMENT PROCESS, SUPPLEMENTARY TO THE PROCESSES THAT TAKE PLACE AT SEWAGE TREATMENT PLANTS.

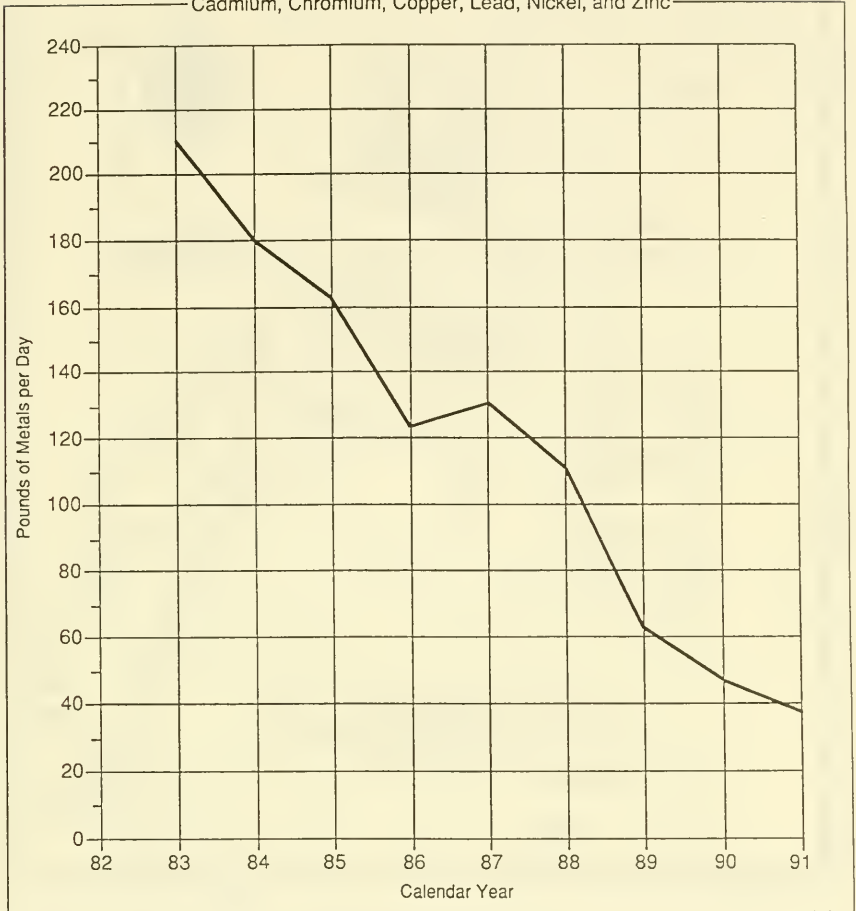
4. Until 1987 the Clean Water Act provided funding of from 55%-75% for secondary treatment improvements. San Diego received about \$30 million during that period. More recently San Diego has received an additional \$85.5 million in special appropriations for Coastal Cities.

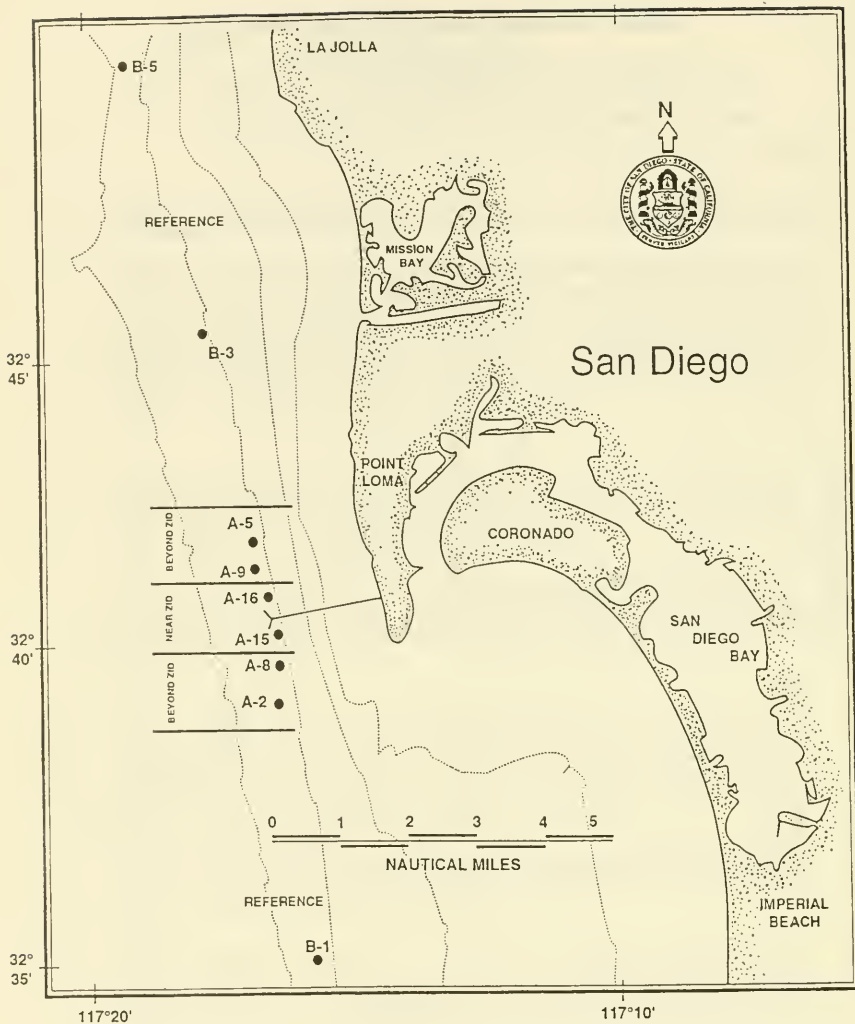
THE REPORT STATES THAT DURING THE TWO DECADES SINCE THE PASSAGE OF THE ACT ABOUT \$76 BILLION WAS SPENT ON SEWERAGE UPGRADES AND THAT, OF THAT AMOUNT, \$50 BILLION CAME FROM FEDERAL GRANTS.

Industrial Waste Pretreatment Program San Diego Area

Heavy Metals from Industrial Sources, 1983 - 1991

—Cadmium, Chromium, Copper, Lead, Nickel, and Zinc—

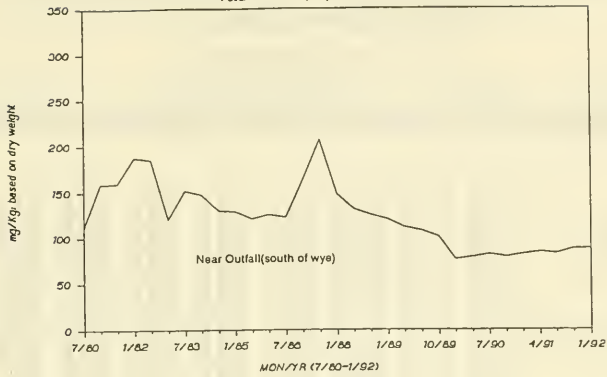




CITY OF SAN DIEGO
OCEAN MONITORING PROGRAM
BENTHIC STATIONS LOCATIONS

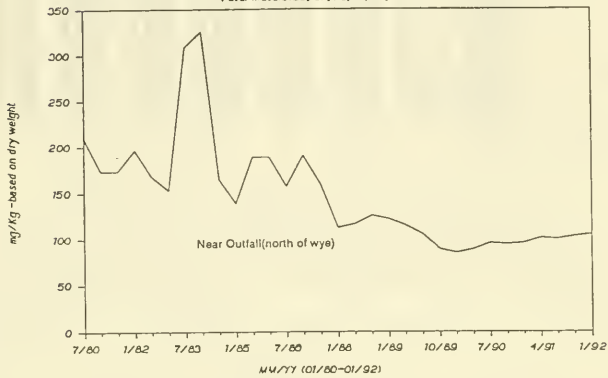
Running Annual Averages: A-15

Total Metals(Cd, Cr, Pb, Ni, Cu, Zn)



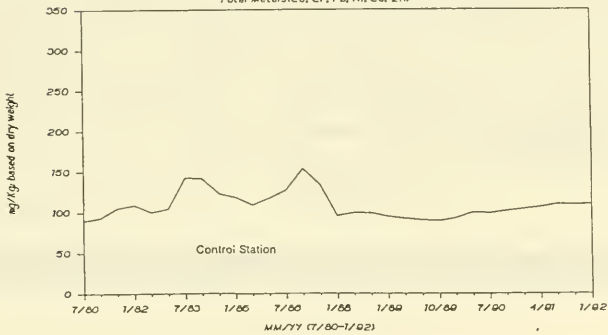
Running Annual Averages: Metals: A-16

Total Metals(Cd, Cr, Pb, Ni, Cu, Zn)

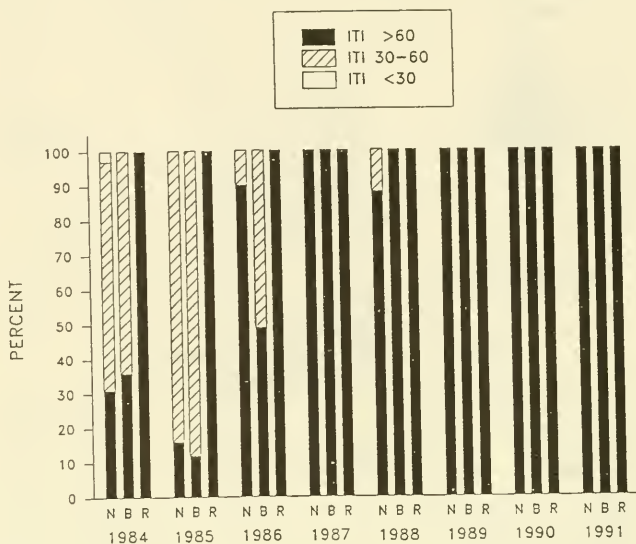


Running Annual Averages: B-4

Total Metals(Cd, Cr, Pb, Ni, Cu, Zn)



POINT LOMA INFAUNAL TROPHIC INDEX (ITI) VALUES



N = Near-Zid stations (A15 & A16); B = Beyond-Zid stations (A2, A5, A8, A9); R = Reference stations (B3 & B5). Data represent the percentage of ITI values in each of the three ITI ranges.

The Infaunal Trophic Index is a dimensionless number (Index) which represents the dominant feeding strategy (Trophic level) of the invertebrates inhabiting soft ocean bottom sediments (the Infauna). This index was developed by Word (1979, 1981) to describe changes in the composition of an infaunal community, as reflected by infauna feeding habits which are driven by organic enrichment of the sediment (e.g., wastewater or estuarine discharges). ITI values less than 30 represent sediments which are "degraded", values from 30 to 60 represent "changed" sediments, and values greater than 60 are "normal" with respect to presumed background conditions.

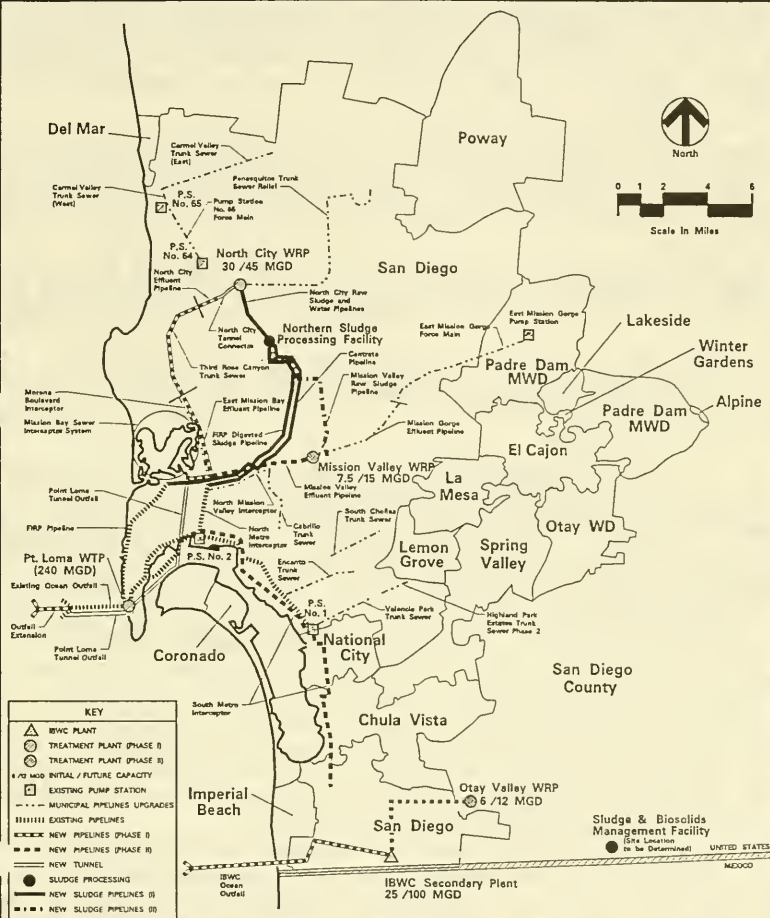
Metropolitan Sewerage System Planned Facilities

Consumers' Alternative

Clean Water – Metro – Municipal

PHASE I
(1992-2003)

PHASE II
(2003-2050)



REVISED 03-18-92

Testimony of Robert L. Simmons, Professor of Law, USD,
and Counsel for the San Diego Sierra Club
July 8, 1993

To Members of the Merchant Marine and Fisheries Sub-Committee:

Stripping away the euphemisms, what the City of San Diego wants from you is an amendment to the "Clean Water" Act that permits them to pollute. In effect, they want an exemption from the Act's treatment standards that will legalize their practice of discharging 25% of their sewage pollutants into our coastal water. The Sierra Club is opposed to any such amendment for three reasons:

1. The City is a chronic scofflaw! After a 1991 trial, our Federal court found the City guilty of having continuously violated the Act's sewage treatment requirements since 1983 and fined it \$3 million dollars. The City still is in violation and recently declared that it would continue its violations indefinitely.

In 1989, the City entered into a consent decree with the Federal government and the State in which the City promised that it would upgrade its sewage treatment to the law's requirements. Yet, in June of last year, the City publicly repudiated this promise.

It seems especially inappropriate for you to reward the City for its "in your face" policy when 90% of all cities on both coasts have fully complied with the Act's standards at great cost to their ratepayers.

2. Sierra further opposes the San Diego exemption because it conflicts with what Federal courts have said is the primary goal of the Act--to compel a steady reduction of waste pollutants into coastal waters. If you allow the City to continue discharging 25% of its sewage solids, the pollution load into our coastal water will steadily increase, rather than decrease, because of population growth.

Dr. Tegner and others may tell you that allowing this increased pollution is all right because it will not harm the marine environment. But, the Federal court judged otherwise. During a trial in February and March of 1991, Dr. Tegner expressed the same opinion. That opinion was opposed by EPA scientists and others. At the end of the trial, Judge Brewster held that the 25% pollutant level in the City's effluent discharges did, in fact, harm the marine environment. I offer you a copy of the Judge's official Findings and Conclusions, and ask that they be entered into your record.

Finally, the City does not disinfect the sewage effluent and none is planned in the future. As experts have testified, no disinfection means that every water-borne disease pathogen goes in the plant's front end, clinging to suspended solid particles. When only 75% of these particles is removed at the plant, 25% of the pathogen load goes through the outfall into coastal waters.

It is ironic that even as you are being told, today, that the present treatment is safe, the City has found excessive pollutant levels near the kelp beds and has banned activities there.

3. The final reason we oppose a San Diego exemption is because it is not needed. The City wants the exemption in order to retain the present Pt. Loma plant and avoid spending more than one Billion dollars in new facilities. But, the Sierra Club wants the same thing. We have a common goal here and it is a goal that can be achieved without weakening the "Clean Water" Act.

In 1991 court proceedings, Sierra presented expert testimony showing that the so-called "enhanced chemical" treatment process probably could bring the City into compliance with the present law's treatment standards for a fraction of the planned upgrade cost. Judge Brewster agreed that this treatment process should be fully evaluated and ordered the City to conduct a one-year test program at the plant. The program is almost complete and a final report is due in August.

Sierra's expert has been directly involved in the testing since its inception. Based on his opinion and other information, we are convinced that, by using the enhanced chemical process, the City can comply with present law at the existing facility.

In conclusion, the City should not be given the exemption it seeks. It does not deserve it because it is a ten-year scofflaw having the declared intention to continue violating the Act indefinitely.

Further, the City should not get the amendment because it would make it impossible for us ever to achieve the Act's goal of reducing pollution discharges into our coastal water.

Finally, the City does not need the amendment because it is possible for it to comply with the present law at a trivial additional expense.

In short, what the San Diego metropolitan public needs is not for you to go back to Washington and tell your colleagues to amend the "Clean Water" Act. What we need is for you to tell the City of San Diego to "clean up its act" and to do it now!

UNITED STATES OF AMERICA and
STATE OF CALIFORNIA,

Plaintiffs,

vs.

CITY OF SAN DIEGO,

Defendant.

SIERRA CLUB, EMILY DURBIN, and
BRUCE HENDERSON,

Intervenors.

Civil No. 88-1101-B(IEG)

MEMORANDUM DECISION

Since February 5, 1991, this court has heard evidence concerning the penalties which should be imposed against defendant City of San Diego (City) for its failure to comply with the relevant provisions of the Clean Water Act. Simultaneously, in an effort to determine whether consideration of the proposed consent decree should be deferred so that the City may pursue a § 301(h) waiver, the court has received environmental impact evidence concerning the Point Loma outfall. Such evidence is also relevant to any consideration of

1 penalties. Upon consideration of all of the evidence presented
2 by the parties, the court hereby enters the following Memorandum
3 Decision, which is not exhaustive of the facts or the
4 conclusions of law to be filed hereafter.

5 I. Deferral of Consideration of the Consent Decree

6 A. Standard

7 As previously ordered by the court, the burden is on the
8 City and Intervenor Henderson to prove by a preponderance of the
9 evidence that the Point Loma discharge is not significantly
10 injurious to the marine environment. If the court finds that
11 the City and Intervenor Henderson have met this burden, then
12 consideration of the proposed consent decree will be deferred
13 until such time as the City completes its pursuit of a § 301(h)
14 waiver. If obtained, this waiver could exempt the City from
15 compliance with the secondary treatment requirements of the
16 Clean Water Act at the Point Loma plant.

17 B. Summary of the Relevant Evidence

18 The parties have focused on three indicia of environmental
19 impact with respect to the Point Loma discharge: (1) the
20 balanced indigenous population (BIP) surrounding the outfall;
21 (2) the impact of the outfall on the Point Loma kelp beds; and
22 (3) the level of disease-carrying pathogens in the effluent
23 which encroach on recreational areas in the kelp beds.

24 In considering the first factor, the court finds that the
25 evidence establishes an alteration of the BIP in an area
26 surrounding the outfall of approximately 1.75 miles. Using the

1 Infaunal Trophic Index (ITI),¹ scientific testimony demonstrates
2 that the BIP has been reduced to approximately sixty-nine in the
3 relevant outfall area, while an analysis of nearby comparable
4 marine regions unaffected by the outfall indicates that the ITI
5 level should be approximately eighty-nine. For a number of
6 reasons, including the fact that prior EPA guideline statements
7 established sixty as the minimum ITI level within the range of
8 normal, the court does not consider this factor to be indicative
9 of significant harm to the marine environment. Clearly,
10 however, a benthic alteration is evident. The evidence failed
11 to demonstrate any intertrophic impact.

12 With respect to the second factor, the evidence suggests the
13 possibility that the Point Loma outfall is adversely affecting
14 kelp recruitment² on the south end and the outer western edge of
15 the kelp beds in at least two ways: (1) sediment coming from the
16 outfall may be blanketing the kelp spore; and (2) the plume of
17 the outfall is causing turbidity, thereby restricting the
18 penetration of sunlight to the lower depths.

19 Intervenor Henderson and the City have failed to prove by a
20 preponderance of the evidence that the outfall is not damaging
21 the south end and the outer edge of the kelp beds. The kelp
22 beds are flourishing, but there is a suspicious erosion of kelp
23 growth along the southern third of the outer edge of the beds,

24 ¹ The ITI measures the demographic makeup of species in the
25 soft bottom.

26 ² Recruitment refers to the process by which the kelp
27 reproduce.
28

1 and a noticeable loss of pre-outfall kelp forest at the south
2 end. Eminently knowledgeable experts disagreed as to whether
3 the outfall contributes to this damage, and the court is unable
4 to find, by a preponderance of the evidence, that it does not.
5 Clearly, many conditions present in the south end complicate any
6 definitive conclusion.

7 Because of its actual and potential effect on public health,
8 the third factor is most significant to the court. The evidence
9 clearly establishes an elevated level of disease-carrying
10 bacteria drifting toward the shore from the outfall, and coming
11 to rest on the outer edges of the kelp beds, as reflected by the
12 levels of total choliform, fecal choliform, and enterococcus
13 present in this area. The levels of these indicators, which
14 measure the presence of virus and bacterial pathogens, are in
15 excess of the levels allowed under the California Ocean Plan at
16 least ten percent of the time, and on some days these bacteria
17 exceed 100 times the lawful level.

18 These bacteria create a health risk to scuba divers and
19 other recreational water users who dive in the kelp beds.
20 Although plaintiffs have argued that these health risks may have
21 been understated by the trial testimony, the court is satisfied
22 that presently the number of reported illnesses exceeds slightly
23 the number of illnesses allowable per thousand under the
24 California Ocean Plan. The court concludes that, although not
25 yet an epidemic, the public health risk to divers in the kelp
26 beds is a significant harm to the environment -- in this case to

1 humans. Furthermore, due to the ever-increasing population and
2 now the imminent treatment of a portion of Tijuana raw sewage,
3 these bacteria levels will continue to rise, increasing the
4 threat to public health from virus and bacteria pathogens.

5 C. Conclusion Regarding Deferral and Environmental Impact

6 Based upon these three factors, the court finds that the
7 City and Intervenor Henderson have not met their burden in
8 proving that the Point Loma outfall is not causing significant
9 harm to the environment. Moreover, the court affirmatively
10 concludes that the Point Loma outfall is causing significant
11 harm to the marine environment, particularly when human
12 recreational interaction with that environment is considered.
13 Therefore, the court will not defer consideration of the
14 proposed consent decree in order to allow the City to apply for
15 a § 301(h) waiver.³ The court will conduct a hearing on the
16 earliest available date as to whether the proposed consent
17 decree is in the public interest.

18
19 II. Penalty Issue

20 Plaintiffs seek total penalties in this action of \$10
21 million, and argue that the penalty may only be assessed as a
22 cash payment to the United States Treasury. The City, in
23 arguing for the imposition of approximately \$1.4 million in
24

25 ³ The court's ruling on this issue is without prejudice to
26 the City attempting to obtain a waiver while the proposed consent
27 decree is being considered or during the implementation of this
28 or any other amended consent decree.

SAN DIEGO, SEWAGE TREATMENT NEEDS, AND THE OCEAN
A Letter to Members of Citizens Coordinate for Century 3

from

Elmer A Keen, Co-chair, Water Committee

PREFACE

"Citizens Coordinate for Century 3 is a thirty-one year old, non-profit, volunteer organization. It is dedicated to improving urban planning, open space and natural area conservation, and the quality of life in the San Diego Region through education and citizen participation." So begins the last column of each issue of the C3 Newsletter. C3 members, committed as they are to the organization's goals, provide the perfect audience that one needs to have in mind when doing a study such as this one. I thank one and all for playing this role for me. I can but hope that the educational goals of C3 will be furthered by the study. Even more, I hope that citizens well beyond the membership will find the study to be useful and will participate accordingly.

Individuals far too numerous to mention by name have contributed information or critical comment or both during the three years that the study has been underway. Special thanks for critical comment on the manuscript at different stages is extended to Monty Griffin, Don Wood, Charles Cooper, Mia Tegner, Bruce Henderson, Kim Shea, Lincoln Loehr, and Warren Johnson. Susan Hamilton and other members of The Clean Water Program for Greater San Diego staff read the final draft but one of the manuscript and made invaluable comments on it. The debt owed to all is acknowledged with deep appreciation. Errors in fact or interpretation, are, of course, my own.

San Diego
May 1992

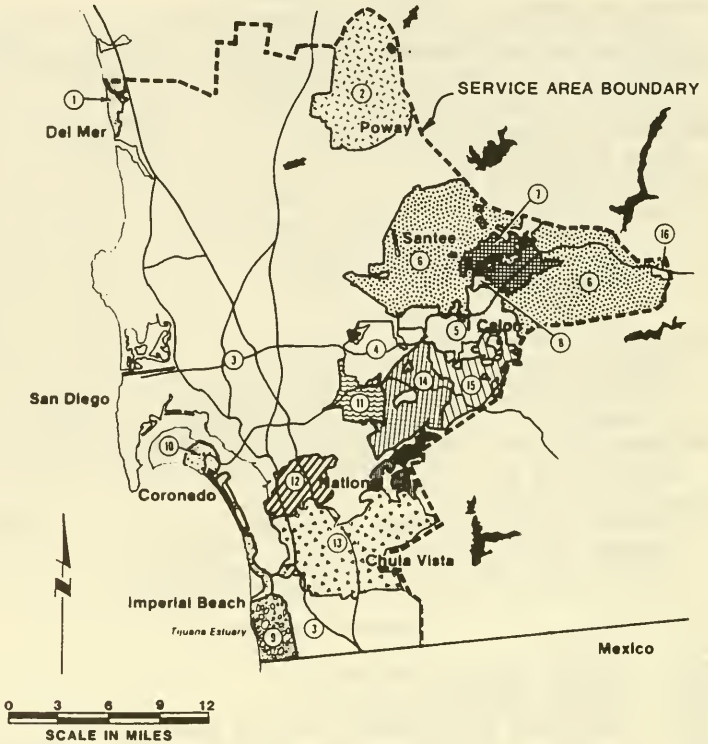
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Abbreviations used

AF - acre foot
 BAT - best available technology
 BIP - balanced indigenous population
 BOD - biochemical oxygen demand
 CEQA - California Environmental Quality Act
 CWA - Clean Water Act (Federal Water Pollution Control Act)
 CWP - Clean Water Program of Greater San Diego
 EPA - Environmental Protection Agency
 ITI - infaunal trophic index
 FJEIR/EIS - Final Joint Environmental Impact Report/Environmental Impact Statement
 MGD - million gallons per day
 mg/l - milligrams per liter
 MPRSA - Marine Protection, Research, and Sanctuaries Act
 NEPA - National Environmental Policy Act
 POTW - publicly owned treatment works
 SCCWRP - Southern California Coastal Water Research Project
 SDCWA - San Diego County Water Authority
 TDS - total dissolved solids
 ZID - zone of initial dilution



LEGEND

- | | | |
|---|--|---|
| ① CITY OF DEL MAR | ⑦ LAKESIDE
SANITATION DISTRICT | ⑫ CITY OF NATIONAL CITY |
| ② CITY OF POWAY | ⑧ WINTER GARDENS
SEWER SERVICE AREA | ⑬ CITY OF CHULA VISTA |
| ③ CITY OF SAN DIEGO | ⑨ CITY OF IMPERIAL BEACH | ⑭ SPRING VALLEY
SANITATION DISTRICT |
| ④ CITY OF LA MESA | ⑩ CITY OF CORONADO | ⑮ OTAY WATER DISTRICT
(SEWER SERVICE ONLY) |
| ⑤ CITY OF EL CAJON | ⑪ LEMON GROVE
SANITATION DISTRICT | ⑯ ALPINE SANITATION DISTRICT |
| ⑥ PADRE DAM MUNICIPAL
WATER DISTRICT | | |

SOURCE: PRELIMINARY INFORMATION REPORT - SECONDARY TREATMENT
FACILITIES PLAN FOR SAN DIEGO, NBS/LOWERY, 1988

CURRENT METROPOLITAN SEWERAGE SYSTEM SERVICE AREA BOUNDARIES

SAN DIEGO, SEWAGE TREATMENT NEEDS, AND THE OCEAN
A Letter to Members of Citizens Coordinate for Century 3
Elmer Keen, Chair, Water Committee

Many of you have followed the controversy concerning levels of treatment needed for San Diego sewage effluent before it is released to the ocean. Most of you are also aware that C3 first expressed strong reservations as to the wisdom of the "most expensive construction project ever undertaken in the San Diego region" in a statement made September 28, 1988. The occasion was the first public scoping meeting for development of plans for conversion of the San Diego Metropolitan Sewerage System from advanced primary to secondary treatment. The project has been questioned widely on economic grounds, but environmental costs alone provide ample reason for C3's reservations.

Given the widespread concern about ocean pollution in the national as well as local mass media in recent years, you may wonder about the C3 reservations concerning the turn to secondary treatment for San Diego. To question C3's position is, at first glance, understandable. Environmental resources have been a major concern of the organization throughout its history. Reports of closure of Mission Bay because of sewage spills, of hospital wastes on beaches, and of pollution of San Diego Bay with various substances toxic to marine life have been frequent in recent years. Secondary treatment removes contaminants¹ from wastewater and supposedly leaves a cleaner environment. Would secondary treatment not reduce degradation of the marine environment about which we hear so much? Does our position fit C3 goals?

Evidence available relevant to the first question strongly suggests that the answer to it is "No." A change to secondary treatment would result in some change in the impacts that San Diego's sewage effluent has on the ocean. Whether the net impact is adverse or not is largely a matter of definition and of personal values. On the other hand, a change to secondary treatment unquestionably will have substantial adverse impacts on terrestrial and atmospheric resources. The total adverse environmental impact would be, in final analysis, greater with secondary than with advanced primary treatment. The answer to the second question thus becomes "Yes." Opposition to secondary treatment of San Diego's sewage as reflected in the C3 statement of September 1988 does fit C3 goals.

The purpose of this treatise is fourfold: 1) to summarize

¹"Contaminant" as used herein refers to any waste in water whether suspended as a discrete particle or in solution. The definition of pollution--"alteration of the quality of the waters of the state by waste to a degree which unreasonably affects beneficial use,"--used in the Porter-Cologne Act, the basic water legislation for California, is followed.

the evidence concerning adverse environmental impacts of San Diego's sewage effluent, 2) to discuss the major reasons that the decision was made to convert to secondary, 3) to compare the environmental and economic costs and benefits of secondary alternatives presented by the Clean Water Program of San Diego and 4) to suggest rational alternatives to secondary treatment that C3 can support.

SUMMARY OF ADVERSE ENVIRONMENTAL IMPACTS

"Policy makers need to know which beliefs about facts are credible and which arguments about values are sound. The credibility of a belief (for example, that the earth is round) depends on evidence and expert opinion, not on the amount that people are willing to bet that it is true." This statement by Mark Sagoff,² a philosophy professor who writes frequently concerning environmental ethics, fits well the San Diego City Council's decision to go to secondary. The beliefs about many of the "facts" concerning ocean impacts involved in the decision are not credible; the arguments about values involved are open to question. Specific personal values that appear important in the decision to convert to secondary are discussed under appropriate sub-headings below. Let us turn first to a broad summary of factual evidence of environmental impacts that will accompany a change from advanced primary to secondary treatment of San Diego region wastewaters.

IMPACTS ON THE OCEAN ENVIRONMENT

San Diego has in Scripps Institution of Oceanography one of the world's premier oceanographic research institutions. Jeffery Frautschy, who retired recently after many years as Deputy Director of Scripps, pointed out in testimony to the San Diego City Council that Scripps scientists have devoted some 7,500 man-years to research that is relevant to the impact that San Diego's sewage effluent has on the oceans off San Diego.³ Scripps' scientists have presented testimony to public agencies on numerous occasions since the issue was first raised in the 1970s; all have said that secondary treatment is unnecessary. The late Dr. Roger Revelle and Dr. Edward Goldberg, both recipients of the prestigious Tyler Environmental Award for their research, have been among the more outspoken of the Scripps' scientists. Professors specializing in marine and marine related fields at San Diego State University and the University of San Diego also see no need for secondary treatment. In addition, a number of

² Sagoff, Mark. The Economy of the Earth. New York: Cambridge University Press, 1988, p.37.

³ Statement of Jeffery Frautschy before the Public Services and Safety Committee of the San Diego City Council June 21, 1989.

environmental assessment and engineering organizations in the region employ marine scientists in varying numbers. I have personally queried many of these scientists as to whether they or any of their colleagues think that San Diego needs to turn to secondary treatment. The answer overwhelmingly has been "No." I feel safe in stating that an almost complete consensus exists in the region's ocean science community against a need for secondary treatment.

Jeffery Frautschy summarized the strong and continuing consensus of ocean scientists in a statement made to the San Diego City Council in December 1986, shortly before the Council voted to turn to secondary treatment. Speaking specifically to effects of the Pt. Loma effluent on the ocean ecosystem, Frautschy said that secondary treatment "...will not improve the ocean environment. In fact, it will probably detract from it. Primitive plants will flourish at the expense of important near-microscopic marine animals in the water column. Food which would have been available to support large animal populations will have been consumed by bacteria in the (secondary treatment) plant..." His overall conclusion was that "...this (the Pt. Loma) discharge is receiving the correct level of treatment. This has resulted in significant net benefit to the marine biota. Unfortunately, the 'wastewater disposal problem' has been so cherished, colonized, and institutionalized that we only hear horror stories largely related to past practices elsewhere, misinformation resulting from lack of understanding of fundamental differences between the open coastal marine biota and the biota of confined bodies of water, and generalizations about residual problems (emphasis added). Never do we hear of benefits."

Scripps marine scientists have been interviewed frequently by television and newspaper reporters since the City Council voted for secondary treatment. Several testified under oath at an evidentiary trial held on the issue by the district federal court in early 1991. The scientists' reactions in all instances in which they have spoken on the matter leave no doubt that their positions have not changed since the Council made its 1987 decision to withdraw the City's waiver application.

Beyond the regional scene, I have kept up with major research findings on waste disposal in the ocean in connection with a course in marine resources that I taught from 1966 until my retirement in 1991 from San Diego State University. Since becoming involved with the issue in 1988 as a member of the C3 Water Committee, I have made a comprehensive survey of the literature on the subject. Included in my survey are several summary studies done within the past 15 years by well-known marine scientists recognized the world over for their ability and

⁴ Testimony presented by Jeffery Frautschy to the San Diego City Council December 9, 1986.

integrity.⁵ I have found nothing written by any marine scientist actively publishing research in the field that suggests primary effluent cannot be placed in the open ocean safely if toxicants in it do not exceed acceptable levels. Effluent from the Point Loma plant meets all EPA standards for toxicants. Coliform bacteria counts sometimes exceed State Department of Health standards at the outer (western) edge of the kelp beds but secondary treatment is not expected to remedy this. The planned extension of the outfall will solve this problem whether the wastewater undergoes primary or secondary treatment.

The one document that most specifically refutes the EPA claim that San Diego's wastewater needs secondary treatment to protect the ocean appeared in March 1991, well after I began this research. It is the Final Joint Environmental Impact Report/Environmental Impact Statement (FJEIR/EIS): Secondary Treatment System and Associated Sludge Management Facilities prepared by the Clean Water Program for Greater San Diego. The study was required by both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The study is comprehensive. Volume One, Secondary Treatment System and Associated Management Facilities, is 525 pages. Backup studies for individual topics summarized in Volume One fill two additional volumes of similar size. Prior to certification by the City Council in the spring of 1991, review of the study was required by all governmental agencies concerned with resources that the project might impact. It was also made widely available for critical review of any and all private citizens or organizations. The comments were numerous and covered every topic that was at all controversial. I recommend the FJEIR/EIS as the most complete and up-to-date statement on environmental impacts of the present and suggested systems for treatment of the San Diego Metropolitan Sewerage District's wastewater.

The FJEIR/EIS concludes that the "Preferred Alternative," that is, the secondary system as planned by the Clean Water Program for Greater San Diego, would have one significant adverse impact--required denial of water contact sports around a South Bay effluent diffuser--that cannot be mitigated. In addition, it would have a variety, the total number and type not yet fully determined, of significant adverse impacts on land and air resources. The "No Project Alternative," that is, the existing Pt. Loma plant expanded to its planned capacity of 240 million

⁵ Special assessments prepared at the request of agencies of the U. S. Government that I used in my research include studies directed by the National Research Council in 1975, 1978, and 1984; by the National Advisory Commission on the Oceans and Atmosphere in 1981; and by the Office of Technology Assessment in 1987. The 1990 federal budget includes an appropriation for a summary study of the issue under direction of the National Academy of Sciences. Scheduled for completion in late 1992, the City of San Diego also contributed \$100,000 to this study.

gallons per day, would have no significant adverse impacts on the ocean environment and, in addition, would avoid the numerous significant adverse on land and water resources. In short, "protection of the ocean" does not hold water as a reason for secondary treatment of San Diego's wastewater according to expert opinion, including that expressed in comprehensive environmental impact studies performed under state and federal laws.

TERRESTRIAL AND ATMOSPHERIC IMPACTS

The FJEIR/EIS concludes that the No Project Alternative would avoid the adverse impacts on terrestrial and atmospheric resources resulting from the proposed secondary system. Significant adverse environmental impacts of the secondary system on these resources are judged to be substantial. Some cannot be mitigated, that is, countered with compensating improvements to comparable environmental resources elsewhere.

The most direct and observable impacts fall on the additional land resources required for the facilities. The Point Loma plant will be expanded northward about 1,000 feet to take up some of the most valuable coastal land resources remaining in the region. The coastal secondary treatment plant planned for the Tijuana River Valley will impinge on habitat for endangered species. Six upstream secondary/tertiary treatment plants that will treat about 40% of the wastewater of the system will be located in existing urbanized areas on land that could serve other purposes with far fewer adverse impacts on neighborhoods. Extensive pipeline networks will be constructed to permit use of tertiary treated water for irrigation in the summer, to transport secondary treated water to the ocean in the winter, and to transport sludge to sludge handling facilities in the North City and Otay Mesa areas. The exact sites for all facilities have yet to be determined, but the total area required will be several hundred acres. Some of the sites have biological, archeological, and/or cultural resources that will be adversely impacted. Monetary costs of mitigating adverse terrestrial impacts are expected to be substantial.

Air resources will come in for their share of contaminants also. Secondary treatment uses far more energy than does advanced primary treatment; it also increases the volume of sludge produced by about one-fourth. Energy production and sludge processing add carbon dioxide and other gases to the atmosphere. The result of the secondary treatment system will be an increase in green house gases, especially carbon dioxide, over the amounts added by advanced primary treatment. Exhaust gases from motor vehicles hauling sludge, people, and materials associated with building and operating a secondary system will be substantial. Wastewater treatment and sludge processing facilities all create malodorous gases. The most effective devices available for control of odors will be installed at all facilities. However, even the most modern of devices malfunction at times; malodorous reminders of the existence of the facilities

can be expected on occasion.

The above brief description suggests the magnitude of the environmental as well as economic costs of this "largest ever construction project for San Diego."⁶ If factual evidence does not support the stated reason--protection of ocean environments and ecosystems--for construction of the project, then why are we building it? Let us turn to the real reasons underlying San Diego's world class construction project.

THE DECISION FOR SECONDARY TREATMENT - BACKGROUND

Federal laws governing discharge of wastewater prior to 1972 were based on receiving water standards. That is to say, contaminant loads discharged into the waters receiving the sewage effluent were not allowed to raise contaminant levels in said waters above levels established under applicable federal or state laws. As one might expect, monitoring the nation's lakes and rivers to assure contaminant levels did not exceed standards was difficult. Once allowable levels were exceeded, determining where the excesses came from and how to reduce them was even more so. Revisions made to the federal Clean Water Act (CWA) in 1972 greatly simplified the problem of enforcement of standards by requiring each publicly owned treatment work (POTW) or private industrial establishment discharging wastes to public waters to use uniform levels of technology regardless of the nature and condition of the water body receiving the effluent. The 1972 revision requires POTWs to use secondary treatment technology or its equivalent even though the receiving water may be of high quality and little affected by the effluent of the POTW. Privately owned industrial plants, with certain exceptions, must use the "best available technology," or "BAT" to remove contaminants to the lowest levels possible. The new standards thus came to be known as "technology based" as opposed to the pre-1972 "receiving water" standards.

Three categories of contaminants--oxygen demanding materials, sediments, and toxicants--in the wastewater created the pollution problems that the 1972 CWA amendments were designed to solve. A fourth category, pathogens (disease causing organisms) in wastewater, is addressed by the CWA but handled largely by state and local health regulations. Secondary treatment is aimed primarily at removal of biodegradable contaminants, mostly organic materials of biological origin, in the wastewater. Some toxic materials and pathogens are removed by secondary treatment, but more effective ways exist to deal with these contaminants.

Oxygen using bacteria account for most of the decomposition

⁶Roger Frauenfelder, the Deputy City Manager in charge of the Clean Water Program, has frequently pointed out in public presentations that this would be a world class project and the largest construction project ever carried out in San Diego.

of biologically degradable contaminants in water. Oxygen depletion to a point that precludes most forms of life except anaerobic bacteria may result if the waste load becomes too large. "Unfishable and unswimable waters" result even if toxic materials are not present. When the demand for oxygen (biochemical oxygen demand or BOD) becomes a problem, the BOD load carried by wastewater can be reduced by forced oxygenation before discharge of wastewater effluent into the receiving water body.

Prior to 1972, most POTWs treated their wastewater at primary levels. The secondary treatment technology called for by the 1972 CWA removes about double the BOD from wastewater as is removed by primary treatment alone. The most often used technique is to force air through, or if space is a problem, to inject pure oxygen into effluent from the primary treatment stage. The secondary treatment plant planned for Point Loma will use the pure oxygen option. This added oxygen speeds bacterial action that decomposes organic matter and removes much of it in the form of sludge and gases before discharge of the effluent remaining to the receiving water body. It is far more costly and uses more resources, especially energy and land, than does basic primary treatment.

The need for secondary treatment by POTWs discharging into rivers and lakes in the more populated parts of the country is unquestioned. The volume of biologically degradable wastes discharged has reached the point that BOD simply exceeds the dissolved oxygen supply in such water bodies, especially during low water periods. The capital cost of secondary facilities has been high, but thanks to federal subsidies and continued pressure from EPA, most inland POTWs now have secondary treatment plants and thus meet the technological standards established by the CWA. BOD as a problem in the nation's rivers and lakes has been reduced substantially as a consequence.

Toxicants in POTW and industrial wastewaters come primarily from products and industrial processes involving use of toxic materials. Pretreatment of industrial discharges required by the CWA and programs to reduce residential contributions of the harsher contaminants, such as waste paints and pesticides, have steadily reduced the toxicant load in POTW wastewater. Control of toxicant use has also helped. For example, with the ban of PCBs, the discharge of them from the seven major POTWs in southern California dropped from 8,730 kilograms in 1971 to 50 in 1987. Among heavy metals, cadmium dropped from 57 to 10 metric tons, and chromium from 676 to 60 metric tons. These decreases occurred despite an increase in effluent flows from 931 million gallons per day (MGD) to 1,213 MGD over the same period.⁷ The San Diego FJEIR/EIS reports that toxic metal concentrations in sediments sampled around the Point Loma outfall are well within

⁷Annual Report-1987, Southern California Coastal Water Research Project, 1988, page 6.

established limits.⁸

Pathogen control in effluent is accomplished largely by incorporation of state standards into the permits for effluent discharge issued under the guidance of EPA. Neither primary nor secondary treatment eliminates pathogens and other microscopic organisms from sewage. Most POTWs that discharge into fresh water destroy these organisms by treatment with disinfectants such as chlorine. Coastal POTWs, however, often avoid the need for disinfection by discharging well offshore at depths below the wave mixed surface layer of the ocean where physical contact by humans is rare. Organisms in properly constructed ocean outfalls are killed by the salt water, safely diluted in the huge volume of receiving water, or consumed by microscopic ocean animal life before they reach areas frequented by humans.

San Diego is in violation of California Ocean Plan standards for coliform bacteria in the outer edge of the Pt. Loma kelp beds. This is one of the three reasons cited by EPA for tentative denial of San Diego's request for a secondary treatment waiver, the others being unbalanced indigenous populations of benthic animals surrounding the outfall diffusers off Point Loma and failure to reduce BOD levels in effluent from the plant to secondary treatment standards set by the EPA. These violations and their relevance to protecting the ocean environment are discussed below.

THE 1972 CLEAN WATER ACT REVISION AND THE OCEAN

Serious depletion of oxygen in many of the country's fresh water bodies was a major reason for the 1972 CWA revision. The BOD loads from the primary treatment plants used by most POTWs simply had proved larger than these water bodies could handle. Enclosed salt water bodies with restricted circulation can suffer eutrophication as well as fresh water bodies; experience with San Diego Bay provides ample evidence of this. Prior to 1963, effluent from cities surrounding the Bay went directly into the Bay. San Diego received a federal government award for construction of the Point Loma treatment plant and the resulting improvement in the Bay's water quality.

Open ocean waters are another matter. The upper layers⁹ of

⁸ Volume 1, Appendix M. page 5-16.

⁹Wave action through mixing of air and ocean surface waters constantly replenishes oxygen in the "wave-mixed" layer which may extend to depths of several hundred feet. Plant nutrients are rapidly used up in the euphotic zone, the layer where sufficient sunlight penetrates to support growth of plant life, primarily phytoplankton. This zone also may extend to depths of several hundred feet although it is usually far shallower in waters off San Diego of concern here. These factors, the enormous volume of water involved, and the constant movement of this water by

most of the open ocean waters of the U. S. are relatively nutrient poor and oxygen rich. However, open waters of the Southern California Bight, into which all southern California POTWs discharge their effluent, have never experienced significant oxygen depletion from BOD and are not likely to do so. The same is true of Puget Sound, a deep enclosed arm of the ocean where vigorous tidal driven circulation and vertical mixing maintain a constant high level of dissolved oxygen throughout the water column.¹⁰ Not unexpectedly, POTWs discharging into such waters questioned the need for secondary treatment with the substantial costs, economic and environmental, that it involves. The BOD violation charged against Pt. Loma outfall effluent by EPA is not expected to stand in the way of a waiver because of widespread recognition that BOD in such waters does not create a problem. This recognition came about in part because of thorough discussion of it the 1991 San Diego federal court hearings.

THE 1977 WAIVER AMENDMENTS

On February 17, 1987 the San Diego City Council voted to withdraw its application for a waiver to the CWA requirement for secondary treatment technology. The application was based on a CWA amendment passed in 1977 that exempts POTWs discharging into marine waters from the secondary treatment standard if they can prove that their effluent meets a number of stringent criteria. Among the more controversial is that it "...will not interfere...with the attainment or maintenance of that water quality which assures ...protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife."¹¹ The City first submitted an application in August

coastal currents assures that the effects of effluent from POTW outfalls discharging into such areas are readily assimilated and become unmeasurable within relatively short distances.

¹⁰The phrase in Section 301(h) (the "waiver" section) of the CWA that permits discharge of effluent treated to primary levels "into saline estuarine waters where there is a strong tidal movement" was added expressly to permit discharge into Puget Sound but to exclude Chesapeake Bay and similar areas where BOD is a problem. I am indebted to Lincoln Loehr of Seattle who read an early manuscript and provided this and numerous other insights into issues surrounding discharge of POTW wastes into marine waters.

¹¹The Water Quality Act of 1987 (PL 100-4), Section 301(h)(2). The basic act, which dates from 1948, is officially titled the Federal Water Pollution Control Act. It is reviewed by Congress every five years; if amendments result, that year's version may be given a separate title. The title, Clean Water Act, given to the extensive amendments of 1972 has come to be

1979, received tentative approval from EPA in September 1981, submitted a revised application in November 1983, and received a tentative denial in September 1986. This tentative denial letter set in motion the City Council's action to withdraw its application.

Southern California coastal cities played a major role in passage of the 1977 waiver amendment. Initially, all of these cities discharged their effluent just beyond the surf zone or, as in the case of cities around San Diego Bay, into the Bay. Rapid post-World War II growth created major coastal water pollution problems. This led to the California State Ocean Plan with its stringent requirements concerning contamination of coastal waters. By the mid-1960s, large sewerage districts had been formed which invested heavily in state of the art primary treatment works with outfalls that discharge well offshore. The San Diego Metropolitan Sewerage District, which handles wastewaters of 8 municipalities and 3 special sewerage districts in the region,¹² took over from a number of smaller POTWs with completion of its Pt. Loma plant in 1963.

The five largest sewerage districts in Southern California created and funded a research agency in 1969, the Southern California Coastal Water Research Project (SCCWRP), to study the "sources, fates, and effects of contaminants entering the marine coastal environment."¹³ California law requires each POTW to carry out an intensive monitoring program on discharges into the ocean. The California portion of the Southern California Bight was already among the better understood parts of the world oceans. The SCCWRP was staffed with an appropriate mix of marine scientists who used existing knowledge and information and new data gathered by the POTWs and SCCWRP to fulfill their charge.

used almost exclusively except in legislative documents.

¹²Agencies with their own governing bodies served by the District include San Diego, Chula Vista, Coronado, Del Mar, Imperial Beach, La Mesa, National City, Poway, the Lemon Grove Sanitation District, the Padre Dam Municipal Water District, and the Otay Water District. Three additional districts, Lakeside, Winter Gardens, and Alpine, are under the County. Decisions concerning the District are made by the San Diego City Council under an agreement that has been in force since the District's inception. However, legislation has been introduced into the state legislature to form a new governing agency, the San Diego Area Wastewater Management District, comprised of the above listed self-governing agencies plus the County of San Diego and the San Diego County Water Authority.

¹³The SCCWRP was formed under a joint powers agreement entered into by San Diego, Los Angeles, Ventura County, the County Sanitation Districts of Orange County, and the Los Angeles County Sanitation Districts.

In 1972, when the CWA revision changed the nation from receiving water to technology based standards, impacts that southern California POTWs' were having on ocean waters were sufficiently well-understood to permit the marine scientists familiar with the issue to speak with considerable confidence. Similar understanding of Puget Sound resulted from long term study of the Sound by oceanographers in the region, especially those at the University of Washington, and of studies conducted in connection with Seattle's solution of problems associated with wastewater disposal in Lake Washington.

The high level of understanding described above makes it easy to understand why southern California POTWs played a major role in the 1977 waiver amendments. Toxicant levels in effluent going to the ocean from their POTWs had fallen steadily in response to the California Ocean Plan requirements. With rare exception, they met standards set by the EPA, standards adopted in large part from California requirements established before EPA was formed. Nutrients in the effluent undoubtedly were affecting marine organisms if only to increase their growth. In balance, however, the effects appeared neutral at worst and possibly benign. BOD was so low as to be of no concern. The amendments were debated thoroughly in Congress. Prints of testimony presented to Congress contain long passages as to whether all, part, or none of the ocean waters off the country would qualify for a waiver. In the end, the consensus was that open waters off the Pacific coast, Hawaii, and the Virgin Islands would qualify but that Atlantic and Gulf of Mexico waters probably would not.

Most coastal POTWs of California, including San Diego, were cited by name in the hearings as reasonable candidates for a waiver. Preparation of applications for waivers began with high expectations. Suffice it to say that reality has fallen far short of expectations. The EPA accepted 208 applications nationwide but only 49 have been granted. Of these, all but 5 were for "small" POTWs.¹⁴ The reasons for rejection are complex; damage to marine environments is an oft-stated reason but seldom the real one.

THE STATED REASONS FOR SAN DIEGO

The Environmental Protection Agency cited adverse impacts on the ocean environment as the basis for requiring San Diego to switch to secondary treatment of its wastewater. Two specific reasons were cited: 1) the City's inability to comply with new

¹⁴The EPA divides POTWs into "large" and "small" for waiver applications. A large POTW serves more than 50,000 people or has an average dry weather flow of 5 mgd or more. Small includes all others. Conaty, D. G. 1990. Regional Variation in the Application of Federal Clean Water Act Wastewater Treatment Standards to Ocean Coastal Treatment Works. Masters thesis, Dept. of Geography, San Diego State University. p.33.

California Ocean Plan bacteriological standards and 2) interference with the protection and propagation of a balanced indigenous population of bottom dwelling ocean organisms in the vicinity of the Point Loma outfall.¹⁵ BOD as a reason for requiring secondary treatment received considerable discussion as a reason during the 1991 federal court hearings on the subject.

KELP BED CONTAMINATION

The State Ocean Plan non-compliance resulted from a 1983 amendment of the Plan that extended water contact sport restrictions on contamination to all kelp beds. Although the Pt. Loma outfall diffusers discharge well beyond kelp beds in the area, ocean currents do at times bring effluent back into the outer portion of the kelp beds. Samples of water taken at such times exceed allowable levels of coliform bacteria, the usually benign species of intestinal bacteria found in large numbers in sewage effluent that are used an indicator that pathogenic organisms also may be present. Recreational divers frequent the area subject to contamination, primarily in search of abalone and spiny lobster which are relatively abundant there.

Local agencies can request that areas populated with kelp be "de-designated" (excluded) from the 1983 Ocean Plan requirement if proof is provided that no health problems result from contamination. San Diego was preparing a de-designation request at the time the EPA letter of tentative denial was received. A preliminary study completed in 1985 had found no evidence of illness among recreational divers that could be attributed to the effluent. Further study was underway in 1986,¹⁶ but was discontinued after the City Council withdrew its waiver request to the EPA. James R. Stewart, Diving Officer for Scripps Institution of Oceanography, has testified that no health problems unique to the area resulted from 16,325 documented dives made by Scripps personnel between 1976 and 1990. He professes to have no reservations about continuing to dive in and around the kelp even though he is aware that coliform bacteria exceed state standards there from time to time.¹⁷

The City began searching vigorously for ways to meet the Ocean Plan requirements when it withdrew its waiver application. A disinfection measure of some sort was deemed most feasible

¹⁵Environmental Protection Agency. "Letter of tentative denial of the City of San Diego's 301(h) waiver request." EPA Region IX office, San Francisco, 9/30/86.

¹⁶Department of Water Utilities. Report of 1986 Ocean Studies Off Point Loma. San Diego: NBS/Lowry, Dec. 1986.

¹⁷Letter to Roger Frauenfelder, Deputy City Manager, City of San Diego from James R. Stewart, Diving Office, Scripps Institution of Oceanography, dated 4/23/90.

initially, but strong adverse reaction to dangers in transport of disinfectants proposed for use and to possible adverse impacts of the disinfectants on the marine biotic community led to rejection of disinfection as a solution. The City then approved extending the present 11,300 foot long pipeline by about 12,500 feet. This would place the diffuser about 4.5 miles from shore in water slightly over 300 feet deep. At this depth and distance, the Ocean Plan violation should be eliminated. Support for the proposed extension is strong. Judge Brewster of the federal district court has invoked a June 15, 1994 deadline on its completion.

In final analysis, however, solution of the kelp bed contamination issue is of little relevance to the issue of secondary versus primary treatment. Secondary treatment does capture some bacteria with the sludge it removes from the effluent, but not enough to assure compliance with the Ocean Plan if the outfall is not extended. Therefore, the question of whether secondary treatment is needed or not ultimately hinges on the CWA requirement for a "balanced indigenous population" beyond the zone of initial dilution of effluent from the outfall diffusers, wherever they may be located.

THE ZID AND THE BIP

The EPA defines two areas on the ocean bottom in its sewage outfall regulations, the zone of initial dilution (ZID) and the area surrounding the ZID in which a balanced indigenous population (BIP) must exist. The effluent, which is largely fresh water and thus less dense than ocean water, rises rapidly while entraining and mixing with salt water until it loses its buoyancy or reaches the surface. The degree of initial dilution varies greatly. For pipelines discharging in shallow water and not equipped with diffusers, initial dilution may be as low as 10-fold. In contrast, large outfalls that discharge in relatively deep water and that are equipped with long multi-port diffusers can achieve initial dilution of up to a 300-fold or higher. Initial diffusion for the present Point Loma outfall is about 112:1 when a thermocline forms at depths of 40-60 feet and about 253:1 when the thermocline breaks down and the plume reaches the surface.¹⁸ The proposed extension will have an initial diffusion ratio higher than the present one because of its greater depth and longer diffuser pipes.

Dispersal of particles (suspended solids) in the effluent varies widely depending on local conditions. In the Southern California Bight, for example, about 10% of the particles, mostly the larger and heavier ones, may settle in a well-defined zone

¹⁸Environmental Protection Agency. 1977. San Diego Metropolitan Facilities Plan--Draft Environmental Impact Statement. San Francisco: EPA Region IX, pp.336-337.

around the discharge point.¹⁹ The fate of fine particles and of dissolved solids in the effluent is next to impossible to determine accurately because of their rapid dispersion and slow rate of settling.²⁰ Therefore, the BIP area is delineated, as a practical matter, on the basis of effects that identifiable particles reaching the ocean floor have on benthic life.

The ZID includes the area immediately under the area where the plume rises from the diffusers and initial dilution takes place. Defining its outer boundary is subject to some interpretation--the EPA defines it fairly narrowly, but it is to the advantage of POTWs to press for a broader area since a BIP is not required within the ZID. According to Tetra Tech, the firm that evaluated San Diego's waiver application, the City computed the ZID for the Pt. Loma outfall to be 54 acres; Tetra Tech computed it to be 33 acres.²¹ By any definition, however, the area of high fallout immediately under the plume, the ZID, is small, and if the outfall were abandoned, would recover quickly on its own.

Existence or non-existence of a BIP is based on study of the benthic community affected by fallout from the effluent. In general, the food supply provided by the particles of biotic

¹⁹U. S. Congress, Office of Technology Assessment, Wastes in Marine Environments, OTA-O-335, U. S. Government Printing Office, 1987. p. 222.

²⁰The rapidity with which effects of effluent in the water column disappears was explored recently by a doctoral candidate, Alessandra Conversi, at Scripps Institution of Oceanography. Using data from the Pt. Loma, Palos Verdes (Los Angeles County) and Santa Monica Bay (Los Angeles City) outfalls over a 15 year period on water temperature, oxygen saturation, light transmissivity, and water transparency, she found, "While clarity has varied markedly from time to time, statistical analysis shows little or no correlation between water clarity and parameters of the sewage discharge, such as rate of discharge or quantity of suspended sewage solids" ("Impact of Sewage on Ocean Water Clarity," California Sea Grant and the Coastal Ocean Environment, Calif. Sea Grant College, University of California, La Jolla, CA 1992. p. 13). The variations were due to natural causes. Ms. Conversi found detection of the effects of these three large outfalls became for all practical considerations lost in the natural variations despite large increases in effluent flows over the period.

²¹Tetra Tech, Inc. Draft Technical Evaluation - San Diego, 301(h) Evaluation, Bellevue, Washington, Oct. 1980. p.86. This report does not speak in terms of the ZID or a BIP. It does imply that severe degradation existed near the diffuser and that the biotic community had been modified over a 17.2 square mile area.

origin result in an overall increase in the biomass, or total weight of organisms in the community. A major change in species composition that typically occurs is a shift from communities dominated by suspension feeders, such as crabs and mollusks, to ones dominated by deposit feeders such as worms.²² Individuals of species that can utilize the energy and nutrients in the waste increase in number because of the increase in their food supply. Species that cannot make use of the particles show a relative decrease or move out of the affected area. This produces a decrease in number of total species and/or a change in the relative numbers of the two categories of species. The result is an imbalance in the original benthic population in the affected area as compared to control sites in the vicinity that are not subject to particle fallout from the effluent.

An index of benthic species variety called the Infaunal Trophic Index (ITI) is among the more often cited measurements by which EPA determines species diversity around outfalls in southern California. Developed by SCCWRP for use in their research, reliance on the ITI alone to determine if a BIP exists is questioned by marine biologists. However, being easy to interpret, it often ends up carrying considerable weight. The ITI scale ranges from 1 to 100. SCCWRP defined an index number of 60 plus to reflect a healthy population, of less than 30 a severely degraded one. In evaluation of the 1979 application, Tetra Tech noted that Point Loma ITI values in the spring of 1979 were below 30 in the vicinity of the diffuser and that biomass (total weight of plants and animals) had increased over an area of 17.2 square miles because of nutrients from the outfall.

The Pt. Loma plant was upgraded between 1979 and 1985 to advanced primary in order to meet new California Ocean Plan standards. Tetra Tech's evaluation²³ of the City's 1983 revised application showed that values at all but four beyond-ZID stations had an ITI over 60. (The EPA tentative rejection of San Diego's waiver application was based on the 1983 data; the initial application made in 1979 had been tentatively approved.) Dr. Mia Tegner of Scripps assessed the 1988 data in preparation for a meeting with EPA scientists in August 1989 and found only one station beyond the ZID with an ITI below 60. She attributed the low index at that station to the movement of sand by a storm and thus in no way connected to the outfall.

EPA's use of the BIP concept and use of ITI values has been anything but consistent in reference to the ocean off San Diego.

²²U. S. Congress, Office of Technology Assessment. 1987. Wastes in Marine Environments, OTA-O-334. U. S. Government Printing Office. p. 223.

²³Tetra Tech, Inc. Technical Review of San Diego's Pt. Loma Wastewater Treatment Plant Sect. 301(h) Application for Modification of Secondary Treatment Requirements for Discharge into Marine Waters, Bellevue, WA: Tetra Tech, Inc. Oct. 1984.

During the federal district court trial held on the issue in early 1991, EPA lawyers argued for the acceptable index level to be raised to 90 for the Point Loma outfall. This approaches the highest level ever noted for a benthic sample taken off San Diego. In the meantime, EPA recommended approval for a dredge spoil disposal site about 4 miles southwest of the Point Loma outfall that will result in burial of the benthic community under up to 5 inches of silt over an area of several square kilometers. The ITI at the site will drop to well below 30 as a result. The judge noted this discrepancy when testimony on it was introduced at the trial. Possibly it contributed to his acceptance by the end of the trial that the Pt. Loma outfall has no significant impact on the benthic community.

As noted earlier, the FJEIR/EIS supports the judge. Data presented in it in a tabular summary of impacts on the marine environment show that expansion of the Point Loma plant to its full capacity of 240 MGD would result in no significant adverse impacts to the ocean environment or resources off Point Loma.²⁴ The narrative discussion of impacts on marine biological resources contains the following statement:²⁵ "Changes in the benthic composition are significant but not judged to be adverse. Some benthic species would increase their population density within the altered area. Other species would be reduced. Those with reduced densities would not experience significant detrimental effects on their coastal populations since the habitat type under consideration and the geographic ranges of the affected species are extensive and wide ranging along the coast of western North America."

In summary, the Pt. Loma POTW effluent did violate the criteria used by EPA in 1979 and 1983, the years when the City submitted applications for a waiver. Upgrading the POTW from basic primary to advanced primary after 1979 resulted in increased removal of suspended solids from about 55% in 1979 to between 75 and 80% in 1988. The FJEIR/EIS prepared under direction of the EPA and certified by the City Council in 1991 reported there would be no significant adverse impacts to the marine environment if effluent discharge at present levels of treatment is expanded to the original design capacity of 240 MGD, about 30% more than the daily average discharge in 1991. Scripps scientists have described impacts of Pt. Loma effluent as trivial at all times since it began operation in 1963, including 1979 and 1983 when EPA standards were violated. Other marine scientists,

²⁴Clean Water Program of San Diego. 1991. Final Joint Environmental Impact Report/Environmental Impact Statement, Secondary Treatment System and Associated Sludge Management Facilities. Volume 1, Appendix M. p. 1-11.

²⁵Ibid., page 5-92.

including those at SCCWRP, concur in this description.²⁶

What is a "trivial" change? The number of species in the immediate vicinity of the outfall has dropped. The brittle star, an echinoderm with slender flexible arms, has, for example, decreased at the stations of highest deposition down-current from the outfall, but is prevalent in large numbers within the general vicinity. The numbers of individuals of most remaining species have increased sufficiently to raise the total biomass produced to higher levels than existed before the Pt. Loma plant was completed. Addition of nutrients to any ecosystem, terrestrial or aquatic, often creates the same effect--more biomass, fewer species. Change there is, but whether the change is good, bad, or indifferent depends largely on the personal values of the individual judging the change.

Conversion of the Pt. Loma plant to secondary treatment would meet EPA's technology based standards for POTWs and thus, by definition, fulfill EPA requirements for ocean discharge. But to do so would, it can be argued, violate the spirit of the waiver amendment to the CWA. When terrestrial environmental impacts resulting from the conversion are considered, conversion will result in greater overall damage to the region's ecosystems. The findings of the FJEIR/EIS leave no doubt of this. These findings also mean violation of the spirit of the National Environmental Policy Act and the California Environmental Quality Act if the project is carried out. Economic impacts are even less defensible than environmental ones if magnitude only is considered. Why then, has EPA so strenuously resisted the granting of waivers to POTWs such as the San Diego Pt. Loma plant despite the environmental and economic irrationality of doing so? Let us explore possible reasons for the EPA position other than those stated in its letter of tentative denial of San Diego's waiver application.

REASONS AT LARGE - STATED AND OTHERWISE

As noted earlier, 208 waiver applications were accepted by EPA for consideration. This was far more than expected. Ninety-seven came from east coast states, a surprisingly large number since the area was not specifically mentioned in congressional testimony as likely to qualify. The large number overwhelmed EPA resources and help to account for the slowness with which

²⁶See, for example, Alan J. Mearns, "Perspectives on the Cleanup of San Diego Bay," for a recent and apt summary of the irrationality of the secondary treatment system proposed for San Diego. Mearns is widely recognized for his studies on the effects of sewage effluent on the marine life of the Southern California Bight. His article appears in San Diego Bay 1989/1990 Report prepared for the California Legislature and the California State Water Resources Control Board by the San Diego Interagency Water Quality Panel, December 1990, pp. I-9 to I-22.

applications were processed.

As San Diego's experience shows, processing has been slow. Had the City Council not decided to withdraw its application, a final decision probably would have dragged on for years. Decisions were still pending on 22 applications in 1990, eight years after acceptance of applications ceased. Only 49 of the 208 total had received approval, and all but 5 approvals were for POTWs serving less than 50,000 persons. A larger number of applications would have been considered if EPA had not disallowed all that did not first receive approval at the state level. For example, 30 waiver applications were rejected by Washington State because of an obscure state law that discouraged consideration of relevant scientific information in evaluating waivers.²⁷ No applications were received from POTWs on the Gulf of Mexico, presumably because of testimony to Congress that the Gulf was too shallow to permit waivers. California POTWs topped the nation on a state basis with 38 applications. Of these, 3 have been approved, 6 are pending, and 29 have been denied or withdrawn.²⁸ Of the three California approvals, only one "large" POTW, that for Orange County, received approval and then only after part of its waste water was given secondary treatment. Explaining this low rate of approval for an environmentally sound program became the main reason for my research on the subject. I have not been alone in my interest. It has been the subject of several analytical articles and one major hearing by a committee of Congress. Literature on the subject, including numerous Congressional hearings on the CWA and other legislation on waste disposal in the ocean, has been my primary source of information. Individuals in the San Diego area involved with the issue have provided additional information and valuable insights based on their personal experience and observations. Not unexpectedly, no clear-cut answers exist. The factual aspects of ocean disposal of wastes are complex and not well enough understood to permit absolutely definitive answers; personal values of individuals involved in making decisions are strong and becloud interpretation of the complex facts needed to reach objective conclusions. The result is a complex of reasons, explicit and implicit, for vacillation toward or outright rejection of the waiver program. For convenience in discussion, I have divided the reasons into three categories: 1) EPA and individual state reluctance to approve waivers, 2) public concern about ocean pollution, and 3) opposition to waivers in order to achieve other

²⁷Loehr, Lincoln. 1986. "The Exclusion of Science from Major Water Quality Decisions," Marine Pollution Bulletin, V.17, #11, pp.489-493.

²⁸Daniel G. Conaty. 1990. An Analysis of Regional Variation in the Application of Federal Clean Water Act Secondary Wastewater Treatment Standards. Unpublished masters thesis, Department of Geography, San Diego State University. p. 40.

goals.

EPA RELUCTANCE

Congress specifically designated the EPA as the executive branch agency responsible for administration of the CWA. This means that EPA personnel must write and enforce regulations to implement the act. The CWA waiver amendments were, as noted above, hotly debated in Congress. As is often the case with controversial legislation, vague wording sometimes resulted from compromises made to gain sufficient votes for approval. Vagueness in legislation gives greater leeway to the administering agency in writing regulations based on the legislation. Regulations written for the CWA reflect the reluctant attitude EPA demonstrated toward the waiver program from its inception. In the words of Congressman Levitas of Georgia, EPA's 1979 regulations were so strict that "They had a chilling effect on...municipalities who said in effect, 'If that is the attitude of EPA on this, it is not really worth it for us even to make the effort to apply.'"²⁹ Lawsuits and complaints from potential applicants, Congress, and the General Accounting Office led EPA in 1982 to make the regulations somewhat less restrictive, but the regulations still reflect EPA reluctance toward the waiver program. I divide reasons for this reluctance into four aspects for discussion: a) increased complexities of CWA enforcement created by waivers, b) internal factors within EPA, c) an EPA emphasis on resource recovery, and d) perceived inequities between inland and coastal cities created by waivers.

Increased Complexities of Enforcement -

Difficulties with enforcement of federal standards prior to the 1972 act drove home the complexities associated with receiving water standards (see Background section above). The variables affecting contaminant levels in receiving waters are many. Whether pollution exists depends largely on the nature and volume of contaminants in relation to the volume of receiving water, that is, to the degree that the contaminants will be diluted by the receiving water. Water volume varies at least tenfold in most watercourses in a normal rainfall year. Watercourses that are more than able to handle the BOD of effluent during average flows may become so depleted of dissolved oxygen during drought periods that their ability to support life drops precipitously. The volume and variety of contaminants entering receiving waters also vary greatly over time, especially contaminants that come from non-point sources such as

²⁹U. S. Congress, House, Committee on Public Works and Transportation, Implementation of the Clean Water Act (Concerning Waiver Provisions for the Municipal Ocean Dischargers), Hearings Before the Subcommittee on Investigations and Oversight, 1st and 2nd sessions, 9/18/81 and 2/18/82, p. 475.

precipitation runoff from urban and agricultural areas. In many water bodies, non-point sources contribute more contaminants than do point sources such as sewer outfalls. Contaminant loads in the first flush of runoff after a long dry spell are almost always much higher than after an extended period of rainfall. To determine whether receiving water standards are being exceeded under such variable conditions is, understandably, difficult. Determining where the contaminants come from is more difficult, and finally, determining which sources must control inputs of contaminants to reduce levels in receiving waters to allowable standards approaches the impossible.

Given the above factors, the EPA understandably welcomed abandonment of receiving water standards in the 1972 revision of the CWA. The waiver amendments of 1977 called for reinstitution of receiving water standards for at least a part of the ocean waters of the country. That the EPA might view the amendments as an opening wedge leading to further abandonment of the more easily enforced technology based standards thus would appear predictable.

The complexities of enforcement do weigh strongly against use of receiving waters standards for enclosed water bodies once the capacity of the body to handle contaminants concerned is approached. Open marine waters, however, present far fewer complexities than do enclosed water bodies. The volume of the receiving water is much larger and, for all practical considerations, constant. Dissolved oxygen depletion, the major problem in most enclosed water bodies, is never likely to be a problem in the island and Pacific coast areas cited as appropriate for waivers in the 1977 waiver amendment hearings. The CWA and companion environmental legislation passed in the early 1970s have greatly reduced toxicant inputs from industries and other sources that discharge into POTWs. With outfalls of proper length and diffuser design, many Gulf of Mexico coastal POTWs, cited in the 1977 hearings as being unlikely candidates for waivers, possibly could now discharge primary effluent to the ocean with an overall advantage to the environment.

In conclusion, technology based standards applied across the board do make enforcement of the standards easier in the open oceans as well as for enclosed water bodies. Ocean variables, however, are fewer and more easily managed. Eutrophication to problem levels is a long way off in most marine waters of the United States, shallow bays and estuaries with large contaminant inputs excepted. A consensus also is growing among marine scientists that heavy metals are not the problem in the ocean they were once thought to be. Most metals occur naturally in ocean water; life there evolved in their presence to a much higher degree than did life in fresh waters. Benefits deriving from applying the waiver amendments at least as liberally as Congress intended appear to far outweigh the costs--political, economic, and environmental--of not doing so.

Internal Factors Within EPA

The EPA is a young agency. Formed in 1970 by pulling together a number of branches and groups concerned with environmental matters that had been scattered among other Executive Branch agencies, it was designed to unify enforcement of almost all of federal environmental legislation. The task was largely a new one. The environmental crisis developed rapidly as a result of the increase in volume and number of contaminants brought about by the post-World War II surge in technology, material wealth, and population. Experience in administering such legislation was weak; the technological basis for doing so was perhaps even weaker. Employees transferred from the other branches had to break old habits; large numbers of new employees had to be trained from scratch. A smooth working and effective organization obviously would be years in the making under the best of circumstances.

A decade after its formation, a presidential administration that did not view regulatory activities of the federal government kindly, and viewed environmental legislation as being especially onerous, took over the reins of government. The Office of Management and Budget looked upon environmental programs as prime targets for budget cuts. The EPA operating budget declined by about one-third between 1980 and 1983; research and development funds were cut by more than half. Personnel-wise, the EPA dropped from 14,269 in January 1981 to 11,471 in November 1982. Some 20% of the scientific staff left, including a disproportionate number of the more capable ones. Newly appointed EPA Chief Administrator Anne Gorsuch (later Burford), recognized as no friend of environmental legislation, replaced top administrators under her with people who thought as she did.³⁰ Prior to the Reagan administration, EPA had strong support from environmental organizations. Soon afterward, it came under fire from suits filed by its former supporters for failure to enforce environmental laws.

The environmental laws that the EPA is charged with enforcing in themselves pose a dilemma for that agency. These laws were passed at different times under jurisdiction of different committees and often under somewhat different philosophies. The CWA, for example, is focused on waste disposal in the ocean to the former three mile territorial limit although outfalls extending beyond 3 miles fall under it. The Marine Protection, Research and Sanctuaries Act (MPRSA), also known as the Ocean Dumping Act, primarily concerns waste disposal beyond the territorial limits although it addresses dredge spoil disposal within these limits. Federal water pollution control legislation dates from the late 1940s. The CWA retains much of

³⁰Vig, Norman J. "The President and the Environment: Revolution or Retreat?" in Norman J. Vig and Michael E. Kraft, eds., Environmental Policy in the 1980s: Reagan's New Agenda. Washington DC: CQ Press. 1984. page 86 ff.

the managerial thrust that guided earlier legislation from which it evolved. The MPRSA, passed in 1973 at the height of the environmental movement, is almost passionately protectionist in its philosophy. Congressional committees have their own turf and protect this turf jealously at times. In the House of Representatives, the CWA is under primary jurisdiction of one committee, the MPRSA is under another. In the Senate, they are under different subcommittees of the same parent committee. The EPA administers both laws and must be sensitive to the members of the respective committees that have jurisdiction over them. The EPA must also enforce the Clean Air Act, which keeps being tightened and making the incineration of sewage sludge more difficult. New sludge regulations proposed in 1989 will, if approved, add restrictions to use of sludge for soil amendments. A recent amendment to the MPRSA forbids disposal of sludge in the ocean after 1991. The degree to which conflicts in laws complicate waste disposal is difficult to quantify, but reducing the contradictions can only help.

The all too brief account above suggests the problems faced in building a large, effective regulatory agency in a new, extremely complex, and poorly understood field. Intellectually, we accept the world ecosystem as being like a spider's web--disturb one part of it and all other parts reverberate to the disturbance. We can feel sure that the administrators of EPA understand this, but managing the web as a unit is anything but easy. Subdivision of the whole for administrative purposes within EPA has been necessary; getting the subdivisions to pay attention to the whole web has proved difficult. Operational responsibility for environmental pollution has shaken down over time into five divisions,³¹ each headed by an assistant administrator. Two of these, the Assistant Administrator for Water and the Assistant Administrator for Air and Radiation, are responsible primarily for all contaminants in a "medium" of the environment--water and air respectively. Two others, the Assistant Administrator for Solid Wastes and Emergency Response and the Assistant administrator for Pesticides and Toxic Substances, are charged primarily with control over specific controlled materials or substances in all media. The remaining one, the Assistant Administrator for Research and Development, has responsibility for research to develop standards for contaminants and for ways to reduce their impacts on the environment.

Each of the first four EPA administrators described above has prime responsibility for the laws most appropriate to the division that he or she heads, laws which, as we have seen, may contradict each other in some respect. Each of the five must

³¹Titles and responsibilities of divisions of EPA used here are from the EPA Organization and Functions Manual--1985 Edition published 5 April 1985. As with most large organizations, reorganization is a continuing process.

also interact to some degree with the other four individually and/or collectively in reference to almost all environmental laws if EPA is to fulfill its charge to administer these laws effectively. That some aspects of the laws fall through cracks between divisions, become the subject of controversy in interpretation of meaning, or become weakened in turf struggles between divisions is regrettable but probably unavoidable.

Having environmental regulation under one agency of the Executive Branch rather than fragmented among many as in pre-EPA days makes good sense. However, the complex of factors described above has resulted in compartmentalization within EPA that still inhibits an integrated approach to problems affecting the web as a whole. Apart from effects of this compartmentalization, each division does not always have time to coordinate problems of the moment with other divisions even though the problem calls for coordinated action. Contradictory pressures from Congress, environmental groups, and industries further reduce the likelihood of coordination.

An example of the adverse effects of compartmentalization cited by C3 member Charles Cooper (also professor of biology at San Diego State University) concerned a toxic waste dump in the Ohio River Valley. The EPA section responsible suggested use of electricity to vitrify soil (i.e., turn it into glass) as the best solution for control of the waste. Professor Cooper noted that the massive amount of electricity required would be generated by coal fired plants in the region. Emissions of sulphur, ozone, and carbon dioxide to the air would be increased proportionately. Soil and water pollution from acid rain would increase as would, in turn, the greenhouse effect on the atmosphere. As can be seen, all media--air, water and soil--are affected. To quote from a letter by Professor Cooper published in Science³², EPA has responsibilities in all of these areas, "...yet the agency's compartmentalization virtually precludes its Superfund program from considering such issues in choosing decontamination technologies."

The logical solution in this and many other cases is a cross- or multi-media approach in which all media--air, water, and land--are assessed on a case by case basis. To do so would facilitate disposal of wastes in the least harmful (or perhaps most beneficial) manner. Existence of the need for a cross-media approach is recognized by William K. Reilly, President Bush's appointee to head the EPA. Writing in the July/August 1989 issue of the EPA Journal, Reilly states, "Nearly 20 years' experience has shown us that single-medium laws based on containment and treatment of individual pollutants have limitations. They usually don't remove pollutants from the environment, but merely shift them from one environmental medium--air, water, land--to another." He continues, "...we are considering asking Congress

³²Charles F. Cooper. "Hazardous Waste Clean-up," Science, 26 August 1988.

for limited authority to use an integrated, multi-media approach to reducing health and environmental risk--one that would give EPA the flexibility to look at a facility's total emissions to all environmental media, and then impose controls that would result in the greatest risk reduction at the least cost." Let us wish Mr. Reilly well and hope that he gets his way in time to help San Diego obtain the "greatest risk reduction at the least cost" in resolving its wastewater problems.³³

Emphasis on Resource Recovery

The EPA has a general policy that wastes should be reclaimed and converted to resources where possible. The policy is a good one and, in many instances, has paid off well. In reference to wastewaters, pre-treatment by industries has not only simplified the tasks of POTWs in treating municipal wastewaters; it has also resulted in some of these "wastes" being removed and reused over and over again. In addition to industrial raw materials, EPA has stressed the recovery of two other resources, water and nutrients, from the domestic wastewater stream processed by POTWs. EPA's emphasis on recovery of these two resources became noticeably stronger with introduction and passage of the waiver amendments of 1977.

One can hypothesize that EPA resistance to receiving water standards as permitted by waivers accounts fully for this emphasis on water and nutrient recovery. Secondary treatment removes about twice the amount of plant nutrients from sewage as does primary treatment. This in turn leaves the water closer to meeting various requirements for reuse. The cost of secondary treatment is written off to protection of the receiving waters; a higher grade "raw material" for reclaiming sludge and water is thus made available. Resource recovery, especially of water, enjoys considerable public support based on principle alone. Recovery of these two resources for reuse strengthens arguments for having all POTWs on technology based standards as preferred by EPA. The EPA goal of having all POTWs on the more easily administered technology based standard would be furthered; the chances of having a "creeping expansion" of receiving water standards evolve from the waiver amendment would be reduced.

This "hidden agenda" aspect of resource recovery may contribute to EPA's open opposition to the waiver amendments.

³³William K. Reilly. "The Greening of the EPA," EPA Journal, V.15, #4 (Jul/Aug 1989). pp 9-10. The EPA Journal is a periodical published by the EPA primarily for public consumption. The need for a cross-media (also often called a multi-media) approach to pollution control has been covered well in the literature. A good, clearly written presentation on the subject is a publication, New Perspectives on Pollution Control: Cross-Media Problems, that resulted from a conference sponsored by the Conservation Foundation in November 1984. William Reilly was President of the Conservation Foundation at the time.

Testimony at hearings on the 1977 waiver amendments, however, leaves little room for doubt that reclamation of water and nutrients also was a, if not the, major reason for the EPA opposition. Thomas Jorling, the EPA Assistant Administrator for Water and Hazardous Materials³⁴ at the time, unquestionably had the dominant role in formulating EPA's position and actions concerning the waiver amendments. He appeared frequently before congressional committees to testify against the amendment and for secondary effluent only to the ocean as called for by the 1972 revision of the CWA. To read his testimony is to become convinced that his main concerns were neither environmental impacts on the ocean nor uniform technology based standards. To the contrary, he spoke strongly and often of the need for secondary treatment to recover water and nutrients for use on land. His testimony suggests a sincere conviction that primary treatment results in an unnecessary waste of water and nutrient resources. Reduction of this waste alone appears to have been of sufficient importance to him to justify the extra environmental and economic costs of secondary treatment.

Jorling's contribution to EPA's reluctance to implement the waiver amendments is of sufficient importance to justify a brief digression at this point. His career reflects what appears to be long training for and dedicated commitment to environmental concerns. He holds a BA from Notre Dame and an MA from Washington State University in biology with an emphasis in plant ecology, and a doctorate in environmental law from Boston Law College. He was serving as Director, Center for Environmental Studies, Williams College, Williamstown, Massachusetts when he took a two year leave of absence in 1977 to assume the position of EPA Assistant Administrator for Water and Hazardous Waste. Previously, he had served as attorney-adviser in the Solicitor's Office of the Department of Interior and as minority counsel for the Senate Committee on Environment and Public Works, the Senate committee with primary responsibility for the CWA. He appears to have built up a close rapport with members and staff of the Committee. An indication of this is the warm welcome given him by Senator Edmund Muskie, Chair of the Subcommittee on Environmental Pollution of the Committee on Environment and Public who said, "This is your first appearance before the committee since your confirmation hearing. We are happy to welcome you, Mr. Jorling, as a former member of the staff of this committee."³⁵ Attitudes toward him of other members of the Committee support this assessment. He returned to Williams

³⁴Successors to Jorling's position with the EPA are responsible for water only. Responsibility for hazardous materials has been moved to another division.

³⁵Library of Congress, Congressional Research Service. 1978. A Legislative History of the Clean Water Act of 1977, V. 4. p.1.093

College in the fall of 1979 after completion of the regulations for the CWA waiver amendments of 1977. In 1988 he became Commissioner, New York State Department of Environmental Conservation. He appeared in two slots in the NOVA production concerning pollution in U. S. coastal waters, a program which some of you may have seen on public television during one or more of its showings.

Thomas Jorling came across in his testimony before Congressional committees and on the NOVA program as an informed and intelligent person dedicated to helping to solve the environmental crisis. His training and professional career support this assessment. The rapport that he enjoyed with members of the key Senate committee responsible for the CWA gave him an exceptional opportunity to put his ideas into action.

In 1981, Jorling was brought before the Subcommittee on Investigations and Oversight of the House Committee on Public Works and Transportation, the House committee with prime responsibility for the CWA. The sole purpose of the hearing was to determine why the 1977 waiver amendments were not being implemented. The chief witness was Thomas Jorling. When the hearing began, most of the committee members were openly hostile and considered Jorling's efforts while heading the EPA water office to be a major cause for the lack of waiver approvals. That he became such a witness and that he successfully defended himself against a hostile committee bears witness to the breadth of his abilities. Let us return to his contribution to EPA's role in the 1977 waiver amendments.

Jorling assumed the post with EPA as noted above just as the hearings on the 1977 waiver amendments were getting underway. He quickly became EPA's main representative to appear before congressional committees holding hearings on the subject. He also did much of the writing of the regulations for the waiver amendments, a task normally left to specialists at lower ranks. A quote from a letter that he wrote to Senator Muskie dated 7 December 1977, just after the amendments became law, is indicative of his feelings. It reads, "We interpret the provision for modification of secondary treatment requirements for municipal outfalls to limit its application to very special circumstances: those few existing outfalls into very deep waters or very high tide fluctuation areas."³⁶ A statement given in earlier testimony demonstrates his oft repeated conclusion concerning recycling of water and nutrients. It reads, "EPA sees two primary themes in pursuing its mission of water pollution control: (1) to control toxic pollutants and (2) to encourage the conservation, reuse, and recycling of both water resources and the valuable elements contained in the various waste streams currently being discharged to the Nation's waters" (emphasis

³⁶Library of Congress, Congressional Research Service. A Legislative History of the Clean Water Act of 1977, V.3. U.S. Govt. Printing Off., 1978. p. 428.

added; the "valuable elements" are plant nutrients as evidenced in testimony given elsewhere).³⁷

The strong reaction that Jorling's role created later in the key House committee for the CWA is shown by a statement by Rep. Elliott Levitas of Georgia, chair of the Subcommittee on Investigations and Oversight of that committee. It reads, "Congress legislated and he (Jorling) did everything in his power to frustrate what Congress did. I think that is absolutely outrageous and intolerable....He did everything he could during and following the enactment of this legislation to frustrate it."³⁸ Whatever else one may say about Thomas Jorling, he did have strong feelings concerning the waiver program and generated strong feelings in return. The policies that he defended so strongly continue to guide EPA's administration and enforcement of the CWA.

That the EPA still advocates a need to reclaim resources from domestic wastewaters should be clear to anyone who attended the August 15, 1989 meeting called by the San Diego Metropolitan Sewer Task Force at which EPA personnel and Scripps scientists discussed the need for secondary treatment for San Diego. The EPA Region IX Director and scientists accompanying him cited recovery of water and nutrients several times in their advocacy of secondary treatment. They also left no doubt that the EPA position remains strongly against the waiver program overall.

The validity of Jorling's reasoning on reclamation of water and nutrients can be questioned on both environmental and economic grounds. The arguments against nutrient reclamation in San Diego and other cities in southern California are stronger than those against water reclamation. However, treatment beyond advanced primary levels of the entire wastewater stream of a city like San Diego in order to subsidize the reclamation of either water or plant nutrients or both cannot be defended. First a brief look at water.

Water - "California has an acute water shortage--most Californians agree--and we think we should use our program to help solve their overall water problem."³⁹ So stated Jorling during the 1977 hearings. Congressman Glenn Anderson from Los

³⁷Ibid., p.1.093 (V.4).

³⁸U. S. Congress, House, Committee on Public Works and Transportation, Implementation of the Clean Water Act (Concerning Waiver Provisions for Municipal Ocean Dischargers): Hearing before the Subcommittee On Investigations and Oversight, 97th Congress, September 18, 1981 (Los Angeles) and February 18, 1982. U.S. Govt. Printing Office, 1982. p.82.

³⁹Library of Congress, Congressional Research Service. 1978. A Legislative History of the Clean Water Act of 1977, V. 4, U. S. Government Printing Office. p. 1419.

Angeles countered by asking if southern California cities were not being asked to build expensive water reclamation facilities just to send clean water to the ocean. The present-day large flows of water in mid-summer in the Los Angeles River, flows made up of reclaimed water clean enough to meet stringent California regulations on live stream discharge of effluent, demonstrates the validity of Congressman Anderson's concern. The City of Los Angeles capitulated to EPA demands and agreed in 1986 to convert to secondary treatment. By 1990, the city was reclaiming 60 million gallons per day (MGD) of water, 58 million gallons (96%) of which ended up in the ocean.⁴⁰ The Sanitation Districts of Los Angeles County do better. Of 140 MGD reclaimed, 62.1 MGD (44%) is used beneficially, primarily for ground water recharge. Low prices to irrigation users, an average of \$15/AF, also help to account for the higher use rates for the Los Angeles County output.⁴¹ However, releases of the unused portion into the San Gabriel River keeps it flowing strongly year round.

Large scale wastewater reclamation in southern California is hard to justify at the present time, especially if secondary treatment is not required. The costs simply are too high. The high costs result from two factors, the cost of reclamation and the cost of distribution. Data provided in the wastewater reclamation portion of the plans resulting from the order for the San Diego's conversion to secondary treatment illustrate these costs well.⁴² Let us look first at the cost of reclamation to a level that permits use of reclaimed water in an urban environment.

The cost of reclamation as cited in the San Diego Water Reclamation and Reuse Conceptual Master Plan⁴³ comes to \$269/acre foot (AF) if secondary effluent is used as the raw material. This compared favorably with the wholesale charge by the San Diego County Water Authority (SDCWA) of \$227/AF for

⁴⁰Telephone conversation with George T. Ohara, P.E., Chief Engineer and Manager the Wastewater Treatment Division of the Los Angeles City Dept. of Public Works, 6/15/90.

⁴¹Hartling, Earle C. "Expanding the Use of Reclaimed Water in Los Angeles County (1989 Revision)." Handout of the Public Information Office of the Sanitation Districts of Los Angeles County.

⁴²Unless otherwise noted, data for this section are from Clean Water Program for Greater San Diego. Water Reclamation and Reuse Conceptual Master Plan for Modification to the Metropolitan Sewerage System, Volume 1, City of San Diego, July 1989. Cost figures are from page 12-21 of that document except for the wholesale cost of new water which is from page 7-4, and "\$150 or more/AF" for secondary treatment which is from page 1-8.

⁴³Op cit, Table 12-5, p. 12-21.

potable water. The cost of new water is expected to increase more rapidly than the cost of reclaimed water. Thus the cost of reclaimed water at the plant may well be lower than for new water in the near future if cost of secondary treatment can be written off as necessary to protect the ocean environment. However, if advanced primary effluent is the raw material for reclamation, the cost of reclaimed water rises to \$420/AF or more. Thus without the subsidy of secondary treatment, reclamation costs for non-potable uses alone exceed the cost of new water.

The cost of distribution at levels of use planned in San Diego greatly exceed reclamation costs. Under current laws, reclaimed water is not legally potable and therefore requires a distribution system separated completely from existing domestic water systems. For users close to a reclamation plant based on secondary effluent, payment of the full cost of delivery may be acceptable. Distribution costs rise rapidly, however, with distance from the plant, especially in urbanized areas where streets must be torn up to install the new conveyance system.

The Master Plan calls for beneficial use of 70,000 AF/year of reclaimed water: 6,000 AF for live stream discharge and 64,000 AF for other purposes, largely irrigation. Based on the market survey for use of this water, potential customers have been divided into two categories according to their annual volume of use. Type 1 customers use an amount equal to that needed to irrigate five acres or more, Type 2 customers use amounts less than needed for five acres annually.⁴⁴

The market survey conducted to find users for the 64,000 AF planned for irrigation resulted in an almost equal division between Type 1 and Type 2 users. The cost/AF delivered to Type 1 users is given as \$631; the cost to both Type 1 and Type 2 users as \$1,528/AF. The total unit cost is thus about 4 times the cost of new water with the secondary treatment subsidy. It approaches minimum cost estimates for desalinated water, water that can be mixed with regular domestic supplies and improve the overall quality of the final product delivered to consumers. The cost per acre foot under the No Project Alternative, that is, with the existing wastewater treatment system, is estimated to be \$2,115/AF at the proposed reclamation and beneficial use level of 70,000 AF.

The salt content of San Diego's wastewater also presents a major impediment to use of water reclaimed from it. The Clean Water Program defines wastewater with less than 1,000 milligrams per liter (mg/l) of total dissolved solids (TDS) as being suitable for reclamation, 1,000 to 2,000 mg/l as being marginal, and over 2,000 mg/l as being unsuitable. Tests run in 1989 found the TDS level at the diversion point for only one of the six

⁴⁴Clean Water Program for Greater San Diego. July 1989. Water Reclamation and Reuse Conceptual Master Plan, V.1, p.45. for definition of Type 1 and Type 2 users. Cost data appear in Table 12-3, p. 12-8.

planned reclamation plants, Mission Valley, to be within the acceptable quality range of 1,000 mg/l as defined by the Clean Water Program. At 888 mg/l,⁴⁵ this lowest level is still higher than recommended for application to avocados, a major irrigated crop in the region. Levels of TDS at diversion points for 3 plants were in the lower part of the marginal range of 1,000 to 2,000 mg/l and thus recommended only for moderately salt tolerant plants. Water from the remaining 2 plants would be suitable only for plants highly tolerant to salt unless the TDS levels are reduced. Reduction in use of salt activated water softeners will reduce the TDS levels somewhat. On the other hand, conservation of water at levels called for in the proposed federal court Consent Decree will result in higher TDS levels-- possibly to the point of canceling benefits from reduced use of salt in water softeners. Irrigation is the only major use for reclaimed water in the San Diego region. Quality alone will make finding a market sufficient to handle the quantities planned for reclamation difficult.

Californians can only agree with Mr. Jorling concerning the water shortage in California. His statement that, "...we (the EPA) should use our program to help solve their overall water problem" also sparks support from most of us when we first hear it. The environmental costs alone, however, of digging up streets, parks, and the like to build a conveyance system large enough to make use of amounts planned for the San Diego CWP give most of us second thoughts. The increase in water rates and taxes to build and operate the system will surely give second thoughts to those less concerned about environmental costs. More will be said on the subject of new water supplies in later sections. Now for a look at nutrient reclamation and reuse.

Nutrients and energy - Thomas Jorling's testimony and actions while with the EPA, and the policy legacies that he left for his successors, suggest that nutrients and energy contained in organic wastes are not only wasted but do harm when placed in the ocean. Fear of harm is shown in the concern expressed for the "balanced indigenous populations" that become unbalanced when the biotic community as a whole is stimulated to greater productivity by nutrients and energy contained in the wastes. Therefore, he would seem to argue, the nutrients and energy in sewage should be kept on land where they can be used in beneficial ways.

The nutrients and energy of primary concern to Jorling are those contained in sludge. Jorling's testimony supplied to a congressional committee that held hearings in Los Angeles on the 1977 waiver amendments reflects this. When asked for data on the Los Angeles sludge problem, Jorling replied that he did not have details at his finger tips and requested permission to submit a written answer later. Because the testimony was presented in writing, we can assume that the answer was well thought out and

⁴⁵Op cit, p. ES-11.

represents an accurate statement of EPA's position. I quote from it.

"As alternatives to strictly disposal options such as ocean disposal, EPA actively encourages the development and implementation of various beneficial uses of municipal sewage sludge, including land application and energy recovery projects...EPA also encourages, to the extent practicable, the development of sludge practices that are consistent with the fundamental ecological principle that materials should be returned to the cycles from which they were generated. Particular attention has been given to land application of municipal sludge, because many municipal sludges can provide an excellent soil conditioner while conserving and recycling organic matter, nitrogen, phosphorous, and certain trace elements."⁴⁶

The statement suggests that useful recycling of these resources is only possible on land. A somewhat broader view of the nature of these resources and how they can be recycled beneficially is worthy of exploration.

Almost all of the nutrients and energy in wastewater enter it in the form of organic wastes; the discussion here will be limited to these sources. These wastes occur in two forms, suspended solids and dissolved solids. Suspended solids, small bits derived largely from food wastes fed through garbage disposals and incompletely digested food in fecal matter, are the major source of nutrients and energy in most wastewater. Dissolved solids include such organic compounds as the sugars in soft drinks or proteins in milk poured down kitchen drains. They too are an important source.

The nutrients of concern are the elements used by plants, "the nitrogen, phosphorous, and certain trace elements" mentioned in the above quote. The energy of concern is that taken from the sun by the plants and used by them, through photosynthesis, to bind the nutrient elements together. Plants cannot use these nutrient elements again until animal life removes the energy and restores them to elemental or near elemental forms. Animals, from bacteria to humans, remove the energy and nutrients stored in plant material through their digestive processes. The energy can also be removed by incineration. Once nutrients are "recycled" to simpler forms usable by plants, a new cycle can begin.

At the sewage treatment plant, primary treatment removes suspended solids only. Upon entering the plant, wastewater is held for a brief period in settling basins. Heavy inorganic particles such as sand and grit sink rapidly and are removed in the first stage for transport to landfills. In subsequent stages, solids that float are skimmed off, those that sink to the

⁴⁶Library of Congress, Congressional Research Service. 1978. A Legislative History of the Clean Water Act of 1977, V. 4. U. S. Government Printing Office, page 1,434.

bottom are scraped off the floor of the basins. They are then pumped to the sludge digesters for further processing. In basic primary treatment, up to 60% of the suspended solids are removed. At the end of this treatment, the CWA waiver amendments of 1977 permits the wastewater to be discharged to the oceans if contaminant levels and conditions in the receiving ocean waters are acceptable.

Advanced primary treatment carries the sedimentation process of primary treatment a good bit further. Materials are added to the wastewater which cause the suspended solids to flocculate and coagulate into clumps and precipitate out in larger amounts. Advanced primary treatment can consistently remove up to 80% of the suspended solids. Experiments designed to consistently remove suspended solids beyond the 85% level called for in EPA secondary treatment standards were begun at Point Loma in 1991. As with basic primary treatment, the advanced primary process removes few dissolved solids. Dissolved solids, now the major source of nutrients remaining in the effluent, are then discharged to the receiving water body as part of the treatment plant's effluent. Advanced primary treatment produces more sludge than does primary treatment, the volume depending on the materials and processes used, but less than secondary treatment. A terminal level treatment stage, advanced primary technology is usually omitted if secondary treatment is to be carried out.

Secondary treatment picks up where primary treatment leaves off, that is at the 60% suspended solids removal level. In the process used most often, oxygen is supplied artificially by forcing air or pure oxygen through the effluent to stimulate removal of organic wastes by bacteria. This duplicates the process that takes place naturally after effluent is released to a river, lake, or the ocean but at a much faster pace. Up to 95% of suspended solids and a substantial portion of the dissolved solids are oxidized and removed from the wastewater as sludge. A substantial portion of the compounds making up the organic wastes are reduced to simple oxides. Some that can assume a gaseous form such as carbon dioxide and nitrogen may be passed to the atmosphere in the aeration process. The secondary stage produces roughly the same amount of sludge as does the primary stage. As with primary sludge, the sludge usually goes to anaerobic digesters for further processing. Sludges produced by secondary treatment are more difficult to manage than those from primary treatment principally because of poor moisture removal characteristics.⁴⁷

Useful energy in the form of methane gas results from the anaerobic digestion of both primary and secondary sludge. However, the volumes of gas from the latter are only about half

⁴⁷Environmental Protection Agency, Region IX. 1980. Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area Draft Environmental Impact Statement. San Francisco: USEPA, Region IX, pp. I-1ff.

that of the former.⁴⁸ Nutrient content of sludge varies depending on the nature of the original wastes. Nitrogen, for example, usually varies between 2% and 5%, phosphorous between 1% and 3% on a dry weight basis. Organic carbon, at 25 to 30% of the total weight, is by far the largest remaining component of the organic material originally present in the wastewater.

To return to our essential question, the degree to which nutrients and energy in sludge are used to the benefit of humans, the answer rests in how much and at which stage the end products of the treatment process are used. Primary treatment is the lowest level of treatment of municipal wastewater permitted by the CWA. The methane gas produced from primary sludge is more than adequate to cover total energy costs of the primary treatment plant. All of this energy can be, and usually is, used beneficially for heat and/or power. California state law permits primary effluent to be used for irrigation of most non-food crops, pasture for non-milking animals included, and for orchards if the fruit is not touched by the water. Bakersfield's primary effluent, for example, has been used to irrigate crops since 1912; in 1972, 2,400 acres of corn, barley, wheat, alfalfa, cotton, and pasture were so irrigated.⁴⁹ Sludge treated to remove pathogens may also be applied to land as a soil amendment.

If these end products--reclaimed water and sludge--were so used in their entirety, then most nutrients would be made available to plants in a resource chain used by humans. The only resources not recycled to the benefit of humans would be the energy remaining in the sludge and in the organic wastes remaining in the effluent. This energy would be used by bacteria that mineralize elements in these wastes. These bacteria are not directly in a chain producing resources for humans. The energy the bacteria gain therefore would not be of direct benefit. The sludge can also be used as fuel in a steam power plant, but more energy is required to produce sludge than is gained from it as fuel for generating electricity. With secondary treatment, all nutrients can be used in the same way as with primary treatment except for the portions lost as gases to the atmosphere in the aeration process.

With slight additional tertiary treatment, secondary effluent legally may be used much more widely for irrigation than is primary effluent. This includes use in areas where humans may come in contact with it. The nutrient load of the water will be lower because of the additional sludge removed, but to the extent that nutrients have been reduced to their elemental form, they will be immediately available to plants. Secondary treatment requires far more energy than does primary. The result is a net

⁴⁸Vladimir Novotny, ed. 1989. Handbook of Urban Drainage and Wastewater Disposal. John Wiley & Sons, p.205.

⁴⁹Gordon Culp, et al. 1980. Water Reuse and Recycling Technology. Park Ridge, NJ: Noyes Data Corporation, p.58.

energy loss in the secondary treatment process in contrast to the energy gain that can result with primary treatment.

If the effluent from primary or secondary is disposed of in the ocean, then nutrients will be recycled in their entirety by marine organisms, some of which contribute to human food chains. The same is true of the energy in both suspended and dissolved solids since the bacteria breaking down these solids also form part of these food chains. The direct benefits to humans would be smaller, however, than if the end products were fully utilized on land. This is because the nutrients can not be easily directed to ocean food chains that benefit humans as they can on land, and because ocean food chains are longer than terrestrial ones. Since sludge cannot be disposed of legally in the ocean, it must be handled on land under the conditions described above. As noted, the volume of sludge approximately doubles if both primary and secondary treatment are carried out. The volume produced from advanced primary treatment lies midway between the two.

As the above comparison shows, both nutrients and energy can contribute more to the benefit of humans if fully utilized on land and if beneficial use alone, however small and without reference to economic or environmental costs, is the goal. EPA investment in research for ways to reclaim and make use of these by products of solids removed from wastewater has been large. Let us now have a look at the record for sludge utilization in the country.

In reference to beneficial use of sludge, the record in this country is not impressive despite EPA's efforts to encourage such uses. The estimated 7,714,000 tons (dry weight) of sludge produced in 1986 in the U. S. was disposed of as follows:⁵⁰

Disposal method	Percent
Distribution and marketing.....	9.14
Land application.....	15.58
Incineration.....	21.41
Landfills.....	42.30
Ocean disposal.....	5.50
Other.....	6.06

The first two disposal methods are the only beneficial uses of consequence. Distribution and marketing refers largely to composted sludge marketed for garden and landscaping uses. Land application refers to the application in uncomposted (usually liquid or semi-solid) form to forest, pasture, or fields. Incineration can result in net energy production only under the most favorable of circumstances. Energy recovery is not practiced in most incinerators now in use. Ocean disposal is looked upon by EPA as a "strictly disposal option," but some

⁵⁰Anne Jones, et al. Regulatory Impact Analysis of the Proposed Regulations for Sewage Sludge Use and Disposal. Prepared by the Eastern Research Group, Arlington, MA for the U.S.EPA, 1/18/89.

marine scientists hold that sludge can be disposed of beneficially in the ocean.⁵¹ In any event, the Ocean Dumping Act was amended to forbid ocean disposal after 1991. Some methane gas may be gathered from sludge placed in landfills, but beneficial uses, if any, for the nutrients contained are accidental at best. Various efforts have been made to convert sludge to construction or industrial materials, but products that compete successfully with conventional ones are yet to result from these efforts.

Sludge is a bulky product that can be disposed of by POTWS the size of San Diego's only at a substantial cost. After years of unsuccessful attempts to dispose of its sludge locally as a soil amendment, San Diego began in 1991 to pay a composting firm in Riverside County about \$20/ton to cart its sludge away. Not unexpectedly, the 72 largest plants in the country contributed a disproportionately large part of the 45% sent to landfills and the 21% incinerated; transport costs to markets for use as soil amendments are too high for the large amounts generated. Conversely, small cities and towns contributed an outside proportion of the two most beneficial uses, reflecting their low transport costs to nearby markets large enough to absorb their sludge. One would expect, for example, that Bakersfield had no more trouble disposing of the sludge from its primary treatment plants than it did of the effluent as described above.

The data suggest that the country has a way to go before it will be able to make beneficial use of even the sludge generated by primary treatment. Arguments that we should turn to secondary treatment to recover nutrients sound pretty thin when the figures on beneficial uses of sludge produced to date are considered.

To return to the quote, being "consistent with the fundamental ecological principle that materials should be returned to the cycles from which they were generated" is a tall order indeed. Carried to the extreme, Jorling's "fundamental ecological principle" means that nutrients from New Zealand apples in San Diego's wastewater must be returned to New Zealand, from Chilean grapes to Chile, and so forth. One suspects that this "fundamental ecological principle" derives from studies of nutrient and energy flows in intensive subsistence agricultural systems where night soil (human excrement) is a major fertilizer. Such studies were very much in vogue in the 1960s and 1970s when

⁵¹See Douglas Segar, et al, "Beneficial Use of Municipal Sludge in the Ocean," Marine Pollution Bulletin, V.16, #5 (1985), pp186-191 for a general discussion, examples where sludge disposal has proved beneficial to fisheries, and a comparison of the advantages and disadvantages of land and ocean disposal. Willard Bascom, former director of SCCWRP, also gives an optimistic view of the beneficial effects that sludge can have on marine ecosystems in "The Effects of Waste Disposal on the Coastal Waters of Southern California," Environmental Science Technology, V.16, #4 (1982), pp. 226a-236a.

much of our environmental legislation was being developed.

I recall one study done on a village in eastern Asia where a World Health Organization representative introduced supplies of mineral supplements lacking in the diets of the population. The person doing the study announced, with elation, that when the supply ran out after three years, families continued to have adequate quantities of the formerly deficient minerals in their diet. The mineral supplements "imported" over the three year period had been carried to the fields in the composted wastes of the families and incorporated into the soil. The minerals were subsequently recycled time and again from the family table to the fields and back again.

The idea is an ecologically appealing one. The cycle of nutrient use is short in time and distance; the amount of energy required to produce food for a family is small--less than 10% of that required to produce and deliver a comparable amount of food to an American family. The model fits well in subsistence agricultural areas where 90% or more of the food is produced by the family that consumes it and all waste is returned to their own fields as night soil and compost. I leave to the reader's imagination as to how rational a requirement would be that the people of large cities such as San Diego follow suit.

In summary assessment of EPA's stress on resource recovery, I can agree to a water reclamation program that produces water for reasonable uses at reasonable levels, and that emphasizes development of water reclamation technology. A rational case for reclamation at anything like the level spelled out in the proposed consent decree for San Diego, however, is difficult to make. As for the reclamation of nutrients and energy from the wastewater stream, the small portion now used involves a high subsidy; use of a larger volume will require a proportionately higher subsidy. For suitably located POTWs, ocean ecosystems can use these resources far more effectively in regards to the environment, and beneficially in regards to human populations, than can be done through use on land. Given the nature of ocean currents, ultimate transport to "the cycles from which they were generated" of nutrients from New Zealand apples and Chilean grapes consumed in San Diego also is more likely with ocean disposal than with reclamation of them through secondary treatment followed by disposal in a landfill.

Perceived Inequities

"San Diego will not get off the hook on its sewage problems until it pays as much for treatment as St. Louis pays."⁵² This

⁵²Charles Cooper, Professor of Biology, San Diego State University, personal conversation, 1988. Professor Cooper teaches a graduate seminar in natural resources management and has been involved directly in resource management issues from the local to international level for many years. I turned to him

statement embodies a question of equity between coastal and inland communities that grows out of the large difference in the cost of primary and secondary treatment of sewage. The implication is that the difference in cost gives coastal cities remaining with primary treatment a competitive advantage over inland cities required to construct and operate secondary facilities. Robert Grace summarized the issue during congressional hearings in Hawaii on retention of primary treatment there when he said, "The desire to maintain standards of constant severity across the country can be understood...in terms of not giving manufacturers or municipalities in different areas undue advantage."⁵³

The equity issue as a reason for San Diego's sewage dilemma possibly should be discussed elsewhere than under this section on EPA; I do so here because EPA representatives frequently cite it as a reason. I quote from Jorling's reply to a food processor association representative from the San Francisco Bay area at hearings held there by EPA on the draft regulations for waivers.

"One of the reasons uniform technological standards were adopted for both industries and municipalities was the uniformity and the desire to avoid economic advantage as a result of pollution control requirements. Would your industry or members of your industry be concerned if there was a relaxation of pollution control requirements in other areas, with consequent major and significant reduction in user charges...? I am suggesting that food processors in the Central Valley will not be able to take advantage of these reductions and your members will...There is a potential for distortion there. That is bad policy" (emphasis added).⁵⁴

In my opinion, the argument of unfair economic advantage has little merit. Most inland cities, St. Louis and those of the Central Valley included, received a 75% subsidy from the federal government to construct their secondary treatment systems. The authorization for the subsidy expired in 1985; Congress seems to have no intention of renewing it or any other connected with wastewater treatment. In California, the state provided an

early in this research for ideas as to why San Diego was being required to turn to secondary treatment of his sewage. This was among the first of several reasons that he gave.

⁵³Robert A. Grace. Marine Outfall Systems. Prentice Hall, 1978. p.125.

⁵⁴U. S. Congress, House, Public Works and Transportation Committee, Implementation of the Clean Water Act (Concerning Provisions for Municipal Ocean Dischargers) Hearing before the Subcommittee on Investigations and Oversight, 9/18/81 (Los Angeles) and 2/18/82 (Washington, DC), p.461.

additional 12.5% subsidy to POTWs converting to secondary, a subsidy also no longer available. Had the carrot embodied in the waiver amendment not been held before coastal cities for so long--San Diego's first tentative denial of its waiver application did not come until September 1986, almost ten years after the waiver amendment was passed--then coastal cities would have shared in the federal subsidy. If a quid pro quo reason must be given to St. Louis and other cities, let it be the financing of wastewater systems. San Diego taxpayers helped pay for St. Louis' system; the return contribution by St. Louis taxpayers to San Diego's system will be small by comparison.

Professor Cooper also pointed out that a major reason for uniform federal pollution laws of all kinds was to reduce bidding by states for industry through minimizing environmental restrictions. Beyond question, this did happen before enforcement of environmental laws became concentrated in federal agencies. Louisiana probably would have a much smaller petrochemical industry if the same air and water pollution controls had been maintained there as in New Jersey before uniform federal standards were enforced. The Clean Water Act waiver amendment, however, imposes basic standards. Coastal cities that meet conditions will gain a cost advantage when it comes to processing domestic wastewater. Industrial BAT standards, however, remain unchanged so little advantage will accrue directly to industry. Uniform BAT standards prevent bidding for industry by incremental reduction of state standards.

Finally, each region has natural locational advantages that enter into competition with other regions. St. Louis has an enormous locational advantage in reference to the American market when compared to San Diego. The country as a whole will be better off in the highly competitive international economic system that we now have if all regions fully realize cost savings associated with their respective locational advantages.

RELUCTANCE OF INDIVIDUAL STATES

Applicants for a waiver under the 1977 CWA amendments must gain state approval prior to submission of the application to the EPA. Not unexpectedly, rejection at the state level has been honored in all cases by the EPA. Several states rejected all waiver applications from POTWs within the state as a matter of policy. This accounts for the EPA having approved no waiver applications from several coastal states.

Reasons for state rejection of all or part of applications from POTWs within their boundaries vary widely. No attempt will be made here to explore reasons for individual state policies.⁵⁵

⁵⁵Daniel G. Conaty, a graduate student at San Diego State University, analyzed factors affecting applications for secondary treatment waivers at both the state and federal levels. See An Analysis of Regional Variation in the Application of Federal

Officially, the California state government has been supportive of waiver applications since the 1977 amendments were passed. This was affirmed in 1982 when the State Water Resources Control Board (SWRCB) prepared an executive order urging eligible sewage districts to apply for waivers in order to allow more of the state's allotment of federal funds for secondary plants to be made available to California's inland POTWs. This is not to say that the SWRCB has not on occasion influenced decisions on waivers. It did, for example, play a hand in political maneuvering surrounding formation of the Monterey Regional Water Pollution Control Agency that may have contributed to withdrawal of that Agency's 301(h) waiver application.⁵⁶ One can imagine that the strong support given in principle to water reclamation by the SWRCB may also have influenced its leanings at times. However, I have no evidence that this has affected San Diego's application in any way.

PUBLIC CONCERN ABOUT OCEAN POLLUTION

The above discussion of the EPA's role in waiver applications may give the impression that federal and state regulatory agencies played the main or only role. That this is not the case becomes obvious when one looks at the final decisions on waiver applications, especially those made since the mid-1980s. Many were withdrawn voluntarily by the POTW that made the application, not by direct rejection by the EPA. San Diego and the City of Los Angeles both fall in this category. Each had, it is true, received a tentative denial from EPA, and this undoubtedly weighed heavily in their decision to withdraw. Final action by the respective city councils was, however, a formal vote to withdraw despite strong recommendations from experts, including those employed by the city, to the contrary. In Kailua, Hawaii, the city council withdrew its waiver application after tentative approval was granted by the EPA.

Why did the city councils make the decision to withdraw? Chances appeared favorable that the reasons given for a tentative denial could have been worked out for Los Angeles and San Diego; Kailua's application had been approved by all levels of government, including its city council, and had "full support of

Clean Water Act Secondary Wastewater Treatment Standards, a thesis presented in partial fulfillment of requirements for a master of arts in geography, San Diego State University, 1990.

⁵⁶L. C. Loehr and E. E. Collias. 1984. "A Case Study of the Abuse of Science in Sewage Planning," Marine Pollution Bulletin, 17:11, p.440)

well-established University of Hawaii scientists."⁵⁷ For an answer we must look at public opinion concerning the oceans as it had developed by the mid-1980s. First, let us look at development of concern by the public at large into the 1980s and then at subsequent events of importance to the waiver program and to the formation of public opinion.

Events and Development of Public Concern into the 1980s

Concern over degradation of the oceans, and especially their coastal fringes, contributed heavily to the public feeling that led to Earth Day in 1970. Interest in the oceans and ocean recreational opportunities had been stimulated by, and in turn had stimulated, the large post-World War movement of population to the coasts. Increased individual affluence as well as increased numbers meant a greater load of wastes to, as well as recreational demands on, coastal waters. San Diego Bay, for example, was neither swimmable nor fishable by 1960; Chesapeake Bay, a much larger body of water, was well on its way to a comparable state of degradation. Popular beaches of Long Island and of the New Jersey coast required almost constant cleaning to remove the flotsam that washed up on them. Coliform bacteria counts led to increasingly frequent closures of beaches in most heavily urbanized coastal areas in the country. Capped by the Santa Barbara oil spill of 1969, thoroughly covered as it was by the then relatively new television system of the country, the motivation for Earth Day quite obviously received a major contribution from public concern over ocean pollution.

Concerns over beach closures because of pollution had largely disappeared on the Pacific Coast by the first Earth Day. California's wave of beach closures because of pollution from POTWs began in the late 1950s. Public reaction was strong and soon found expression in state laws that led to large investments in wastewater treatment works during the 1960s. In the larger urbanized areas, small coastal plants discharging effluent in the surf zone had been replaced with large, state of the art treatment plants with long outfalls by 1970. California law had also imposed strict controls on the disposal of solid wastes in the ocean by this time. These measures virtually eliminated beach pollution as a problem except where sewage collector systems broke down, a fairly rare event until the 1980s. Major improvements had also been made to sewer systems in the Seattle-Tacoma area of Puget Sound. The Bos-Wash (Boston to Washington) portion of the Atlantic coast was less fortunate. Most sewerage systems there are much older and have combined storm and domestic sewerage systems that greatly complicate treatment of domestic wastewaters. A major rainstorm can easily triple the flow

⁵⁷Rose T. Pfund. 1989. "Ocean Discharge of Sewage: A case Study on Risk Communication," Proceedings of the International Conference on Addressing Methods for Understanding the Global Oceans (Oceans '89), Seattle, Washington, Sep. 18-21, 1989.

through Boston's treatment plants within an hour. Designing a plant to treat such widely varying flows is no easy task; paying for construction and operation is no less difficult. Large inputs from rivers fed by copious precipitation also complicated coastal water pollution problems in the eastern part of the country.

Among waste related pollution events on the Atlantic coast, those of the New York-Newark metropolitan region have made national news most frequently since the first Earth Day. Data for 1972 show that the New York Bight received sewage from 127 major municipal outfalls that discharged, on average, 2,600 million gallons of wastewater per day of effluent, 18% of which was untreated. In addition, there were at least 95 separate industrial discharge points to the New York Bight.⁵⁸ Most of the sewage sludge produced by POTWs in the region was dumped at a designated site twelve miles off Manhattan Island. That waste from two states, New York and New Jersey, contributed to pollution in this heavily industrialized and populated metropolitan region complicated the passage of laws to control coastal pollution.

In the late spring and early summer of 1976, a series of extraordinary natural and human related phenomena coalesced to create a crisis in the New York Bight. Abnormally heavy rains in May in the Hudson River drainage basin brought down exceptional loads of soil and debris from upstream. In late May and early June, oil tanker spills and an oil tank rupture coated much of the harbor area with oil and made tar balls for the beaches, two sewage tanks exploded and dumped a million gallons of sewage into the water, and two large pier fires dumped wreckage and debris in the harbor. The area's beaches remained closed during most of June. Unseasonable southerly winds and abnormally strong northerly currents served to hold this heavily loaded wastewater in the general area much longer than it would have remained under more normal conditions. Oxygen depletion followed and caused one of the largest fish kills on record in the region. Sludge from the 12-mile dumpsite long used for sludge disposal reportedly began to flow landward along the bottom. Cartoonists had a field day. A cartoon in the New Yorker depicting a huge "sludge monster" wave descending on a crowded beach merited reproduction, along with several others, in a scholarly article on marine waste problems.⁵⁹ Needless to say, New York City's ocean pollution

⁵⁸Charles G. Gunnerson. Wastewater Management for Coastal Cities: The Ocean Disposal Option. World Bank Technical Paper Nr. 77, Washington, DC: 1988. p. 260.

⁵⁹M. A. Champ, et al. "Multimedia Risk Assessment and Ocean Waste Management," in Oceanic Processes in Marine Pollution, Vol. 3, Marine Waste Management: Science and Policy, edited by M. A. Champ and P. K. Park. Malabar, FL: Robert E. Krieger Publishing Company, 1989. p. 8.

problems made national news several times that summer and local news almost daily.

Atlantic coastal water pollution problems have made national news a number of times since then although none of the events have been quite as newsworthy as those of 1976. Beach closures because of wastes from Atlantic City to Cape Cod make local news far more frequently than is, or should be, acceptable by the populations using those beaches. By the mid-1980s, Boston Harbor approached the conditions existing in San Diego Bay in the late 1950s. Beach closures also began to make the news in Los Angeles and San Diego with increasing frequency from the late 1970s. In both southern California cases, the cause was urban runoff and breaks in sewage collector lines unable to carry the loads that rapid urban growth was imposing on them. In San Diego, Pump Station 64 serving the Del Mar area became a household word because of breakdowns and resulting sewage overflows, and users of Mission Bay Park often found the waters off limits because of a sewer break. In the Los Angeles city system, the main sewer line from the San Fernando Valley area to the Hyperion treatment works on the coast south of Santa Monica suffered almost as many breakdowns. Ballona Creek, which parallels the line and empties into Marina Del Rey, carried a heavy load of sewage with increasing frequency because of overflows from the line. Residents of neighborhoods along Ballona Creek as well as in affluent Marina del Rey and vicinity were no less unhappy than users of Mission Bay as a consequence.

Public concerns growing out of the problems described above resulted primarily from fear of pathogens in sewage effluent, from nutrients in wastes that led to eutrophication, and from vexation over trash of almost every description washed up on beaches. However, events associated with toxic materials also made headlines on numerous occasions during the period of rapid growth beginning in the late 1950s. Methyl mercury poisoning by fish taken from Minamata Bay in southern Japan was among the earlier and more severe cases making international headlines. Mercury in effluent from a chemical plant on the shore of Minamata Bay contaminated fish that were consumed by local residents. Mercury poisoning caused 121 confirmed cases of mercury poisoning by 1962; 46 resulted in deaths.⁶⁰ The company at fault stonewalled and continued to discharge its poisonous effluent into the bay until 1968. Some of you may have seen the film of the malformed children that resulted from mercury ingested by mothers during pregnancy. If so, you understand how fear and despair over the effects of such toxicants can make a confirmed environmentalist of one whose prior interest in the effects of such contaminants was minimal or non-existent. Foot-dragging by company and governmental officials alike helps one to understand the distrust that the public developed concerning such discharges.

⁶⁰Gunnerson, op cit, p 321.

No comparable tragedy affecting humans has been caused since Minamata by ocean pollution, but toxicants in ground water have created life threatening crises several times in industrialized countries. The consternation resulting from these crises often spills over into our thinking about water, whether salt or fresh. The power of toxicants in ocean food chains, however, was brought home to southern California residents by the near loss of the region's brown pelican population in the late 1960s. DDT discharged into sewers by factories in the Los Angeles area passed through the ocean food chain to the pelicans and weakened their egg shells enough for most to break in the nest before hatching. Fortunately, adult pelicans do not appear to have been seriously affected and new broods began appearing soon after DDT discharges were forbidden in 1971. The DDT incident did, however, strengthen the concern about chemical pollution and its effects on ocean food chains given prominence by the Minamata incident.

By the mid-1980s, events such as those described above had made residents of coastal as well as interior regions of the country well aware that wastes in the oceans can, and often do, create problems. Fresh water pollution problems, especially toxicants in groundwater from toxic waste dumps, enhanced public awareness nationwide. The end result was creation of a generalized concern in the minds of a majority of the people concerning water pollution in any form. This concern began to intensify in reference to ocean waters from the mid-1980s. Unfortunately, as concern intensified, the ability or willingness to distinguish between the different kinds and causes of ocean pollution diminished for all too many of us. Flotsam, including medical wastes, washing up on the beaches, often was associated in the public mind with sewage treatment plant effluent. In reality, such objects could never get through the treatment process at the Point Loma or any other properly operating primary treatment plant.

Development of Public Concern from the Mid-1980s

The factual basis for public concern about the oceans grew and simmered into the 1980s. In the mid-1980s it began to rise to the surface and boiled over into the political arena. Medical wastes washing up on beaches around the country appears to have been the added fuel that brought the issue to a boil. The increase in medical wastes in turn grew largely out of the AIDS crisis and the decision to treat all such wastes as low level hazardous wastes.

The volume of such wastes rose precipitously. My dentist and his assistant, for example, used to wash their hands carefully each time they moved between the two or three patients that usually were under treatment at one time. In the mid-1980s, they began pulling on a new pair of surgical gloves with each change rather than just washing their hands. Between them, they could use 8 to 10 pairs of gloves per patient. The gloves had to go into the hazardous waste bin along with the new "throw away"

hypodermic needles, swabs, tissues, and other materials used in treating patients.

Numerous small businesses sprang up to collect these wastes from dental offices, out-patient clinics, private medical offices and the like and transport them to a waste incinerator for safe disposal. Some entrepreneurs found transport by pleasure boats to offshore waters for disposal to be more remunerative than paying incinerator fees. Almost daily reports of medical wastes on the beaches appeared in the mass media from San Diego to Boston. Control of the added burden of low level hazardous wastes was worked out in a few months, but a public already super-sensitive to wastes in the ocean became even more so.

Hearings held by a committee of the House of Representatives in October 1988 point up the importance of medical wastes as an issue.⁶¹ By that time pollution had become a highly politicized "crisis" and a major issue in election campaigning (see below). A great deal of information was presented on the subject, but of special interest here is the timing of the medical waste problem. In that hearing, an EPA employee was asked why it took the EPA so long to do something about such wastes even though the Resource Conservation and Recovery Act had given authority to do so for years. The EPA employee replied that EPA had circulated a proposal to the states to do so back in 1978. The reply from the states was almost uniformly that medical wastes did not pose a threat or that the states had the issue well in hand. He continued, "In the period of time between 1980 and 1985 there was no indication, really, that the existing system seemed to be breaking down. ...It is relatively lately that ... additional things need to be done."

The 1986 California gubernatorial campaign was the first major west coast instance of statewide politicization of ocean pollution in an election. The main contenders in the election were incumbent Governor George Deukmejian and Tom Bradley, mayor of the City of Los Angeles. Los Angeles, along with San Diego and other coastal cities in the state, had applied for a secondary treatment waiver in 1979. Hard evidence based on scientific studies of the oceanic impacts of Los Angeles sewage effluent fully supported the waiver application. The application was under challenge by EPA in 1986, but to that point, the City Council under Mayor Bradley's leadership had held firm in its support for a waiver. Californians, however, had begun to share in the nationwide rise of concern about ocean pollution. Beaches of Santa Monica Bay were being polluted. Governor Deukmejian took Mayor Bradley to task in the gubernatorial campaign for pollution of Santa Monica Bay by the Los Angeles City primary

⁶¹U.S. Congress, House Committee on Science, Space and Technology, Medical Waste and Ocean Pollution Research and Monitoring: Hearing before the Subcommittee on Natural Resources, Agriculture and Environment, 100th Congress, 2nd. session, October 3, 1988.

treatment plant outfall. A lack of evidence that the effluent from the outfall five miles offshore had anything to do with the beach pollution got lost in the heat of campaign rhetoric. That Mayor Bradley opposed conversion of the City's POTW to secondary promised to become a telling issue in the election. Mayor Bradley quickly asked the Los Angeles City Council to capitulate to EPA; Los Angeles withdrew its waiver in the heat of the campaign.

Two years later, Boston Harbor was to play a bigger role in the presidential elections than did Santa Monica Bay in the 1986 California governor's race. Boston Harbor was in much worse condition than Santa Monica Bay. The diffuser for effluent from the Los Angeles POTW extended a little over five miles from the coast. Marine scientists maintain that, as with San Diego, the impact of the Los Angeles effluent on the marine environment is trivial. No evidence exists that the outfall contributed to high coliform bacteria counts sometimes found in the intertidal zone of Santa Monica Bay. The high counts, even in summer, can be accounted for by urban runoff through storm sewers and breaks in sewer lines before reaching the POTW. Boston, on the other hand, discharges effluent directly into Boston Harbor, a far more enclosed body of water than is Santa Monica Bay. Storm and wastewater sewers are combined in Boston; treatment plants cannot handle full flows from major rainstorms. The result is large inputs of raw sewage into the harbor during rain storms.

The Metropolitan District Commission, the agency that ran the regional POTW serving the Boston area, applied for a 301(h) waiver in 1979. The EPA tentatively denied the application in 1983 but left the door open for submission of a revised application by July of 1984. EPA rejected the revised application in March 1985. Planning for secondary treatment had been delayed during the waiver application process. As with San Diego, planning for secondary treatment was in a rudimentary stage at the time that hopes were abandoned for continued treatment at primary levels.⁶²

In late 1984, the State of Massachusetts created a statewide authority that took over responsibility for the Boston POTW. What had been a Boston area problem became the problem of the governor of Massachusetts. Plan development for the Boston Harbor problem was well underway to remedy the problem when Governor Dukakis decided to run for President. The actual condition of Boston Harbor, however, was as yet unchanged. Not unexpectedly, then Vice President Bush, running to become the environmental president, picked up the Boston Harbor problem as a good campaign issue. The problem belonged to a state agency, Governor Dukakis was governor of that state and therefore directly responsible. An issue far too complex to explain in the

⁶²D. R. Harleman. 1989. "Boston Harbor Cleanup: Use or Abuse of Regulatory Authority?," Civil Engineering Practice, Spring 1989. pp26ff.

heat of a presidential campaign, Boston Harbor became a major embarrassment for Dukakis. The considerable amount of attention given the issue in this national campaign further sensitized the public to ocean pollution as an issue worth worrying about. A very real POTW-associated problem in ocean pollution compared to Santa Monica Bay, Boston Harbor as a campaign issue probably had more of an effect on the perception of San Diegans toward ocean pollution issues than did the bringing of Santa Monica Bay into the 1986 governor's race.

That San Diegans were becoming a bit anxious about their ocean is understandable given the above events. Medical wastes were very much in the news here. San Diego's media followed both of the above campaigns with their ocean pollution involvement quite closely. Environmental organizations by and large supported the EPA position that secondary treatment was the law and that the law should be enforced. One, the Natural Resources Defense Council, published an attractive booklet, Ebb Tide for Pollution: Actions for Cleaning Up Coastal Waters, that presented a less than factually accurate picture of the effects that POTW effluent was having on the ocean⁶³ and spoke against the 301(h) waiver program. The media in general supported the EPA position, also. Small wonder that public sentiment was turning against San Diego's waiver application.

Sensitivities of San Diegans to ocean pollution had been fanned for a decade by a local issue, sewage in Mission Bay, that kept getting worse. By 1980, the sewer mains serving the rapidly growing areas north and east of Mission Bay were becoming old and overloaded. Breaks in them became common; quarantine of the Bay until waters again became clear was necessary. Overflows from plugged and overloaded collector lines into storm sewers that

⁶³The booklet is undated but citation of a 1989 government report (p.23) suggests publication in that year or later. It contains the statement (p.3), for example, that "...swimming in California's Santa Monica Bay has been declared unsafe because of extensive and chronic untreated sewage dumping." The Los Angeles city sewage treatment plant is located on Santa Monica Bay and discharges its effluent through an outfall that extends five miles into the Bay. No beaches have been closed because of discharges from the plant's outfall since the plant began operation some three decades ago.

Los Angeles has had sewage collector line breaks similar to those in San Diego that make Mission Bay unsafe on occasion and result in closures. These breaks have nothing to do with the nature of treatment since they take place before wastewater reaches the treatment plant. Closures of beaches in Santa Monica Bay, as in Mission Bay and elsewhere, also occur because of contaminants in surface runoff. These closures have no connection to sewage treatment plants in either Los Angeles or San Diego since the contaminants in question do not pass through the plants.

empty directly into Mission Bay also caused closures of it all too frequently. As a consequence, the Los Angeles Times reported in June 1987 that, "Since 1980, health officials have quarantined all or part of the Bay for more than 700 days--or 27% of the time."⁶⁴

Penasquitos Lagoon in Torrey Pines State Preserve also came into the news frequently. Pump Station 64 on the edge of the lagoon broke down and flooded the lagoon with sewage so often that it became a household word in the Del Mar area. Completed in 1972, breakdowns began in the late 1970s and grew continually worse as population burgeoned in Del Mar and the North City area. Pump Station 64 and the Mission Bay spills became a major sore point, and justifiably so, with personnel of EPA's Region IX office in San Francisco. Failure to correct these problems kept ocean pollution in the forefront in the local media and did much to bring down EPA ire on the City. The EPA vexation was reflected in the strong condemnation of the City's failure to prevent sewage spills expressed by EPA lawyers in the 1991 federal district court trials. The EPA's vexation was well-taken. The City was sorely remiss in failing to maintain the sewage collector system and to expand it as needed.

WITHDRAWAL OF SAN DIEGO'S WAIVER APPLICATION

As noted earlier, the San Diego City Council voted February 17, 1987 to discontinue pursuit of a waiver under Section 301(h) of the Clean Water Act. The Council's decision saddled the residents of the San Diego Metropolitan Sewerage District--everyone from the northern boundaries of Del Mar, San Diego, and Poway south to the international border--with the economic burden of the region's largest construction project ever. The project as planned imposes adverse environmental impacts that exceed substantially the impacts of continuing with the present system. It calls for spending huge sums of money with few, if any, lasting economic or social benefits to the region. It was a bad decision.

The Council vote was seven yeas, one nay, and one absent to withdraw the waiver application. The decision was made near the peak of the strong public concern for ocean pollution that had evolved as described above and that had become a strongly politicized issue. The issue of sewage effluent impact on the ocean is a complex one. The members of the Council came from a variety of backgrounds; none had much training or experience relevant to understanding the issue. Only two had been on the Council during previous considerations of the waiver. We can assume that all of the members had a higher than average interest in public affairs in general or else they would not have run for office. For this reason alone, they would have played closer

⁶⁴Jennifer Warren. 1987. "Mission Bay's Sewage Woes," Los Angeles Times (San Diego County Edition) June 15, 1987, p.1.

attention to, and thus have been even more strongly influenced by, the rising concern over ocean pollution than most of us.

Persons testifying against the waiver in hearings leading up to the decision outnumbered by far those presenting testimony in favor of it. The testifiers against included those who spoke with the passion of youth and the experience of arguing cases before the courts. The Council also heard officials from the chief federal agency responsible for enforcing environmental laws tell them that San Diego was breaking the law and impinging on an environment--the ocean--of great importance to its citizens. Testimony of marine scientists, whose professional training demands that facts be interpreted and presented objectively and dispassionately, carried little impact.

Given the mood of the times and the backgrounds of the decision makers, one can understand the votes for withdrawal of the waiver. However, facts supporting the rationality of a waiver on environmental grounds began to regain public attention soon after the waiver withdrawal vote. The findings of the FJER/EIS for the system as planned should remove any doubts as to the wisdom of remaining with the present system as far as adverse environmental impacts are concerned.

The economics of the proposed system were questioned early but a lack of firm cost estimates kept the issue out of the limelight. After long delay, estimates of the capital costs of Phase I of the proposed secondary treatment and reclamation system were released in March 1992. With financing costs included but reclaimed water conveyance costs excluded, the estimate came to \$5.5 billion. The reclaimed water conveyance system for Phase I is expected to cost \$403 million before financing is included, and some accounts suggest that the full cost of both phases could reach a grand total of \$11 to \$12 billion.⁶⁵ Operation and maintenance costs of the new system would be far higher than for the present system expanded and improved as needed. To spend such sums under the guise of protecting the ocean environment only to end up with a far more adversely impacted environment than with the present system expanded as needed simply fails to make sense.

The basic question becomes, "Can the decision to turn to secondary treatment be reversed?" If one accepts the federal Clean Water Act as being set in concrete, the answer probably is, "No." The regulations written by EPA for implementation of the CWA say that once the decision is made against application for a waiver, the decision cannot be reversed. Loopholes permitting San Diego to reinstate its waiver application may exist but this route is far from certain. A more certain way is to change the CWA to have it more clearly incorporate realistic provisions for ocean discharge. The CWA is up for review by Congress in 1992 which presents an opportunity for considering the changes needed.

⁶⁵Kathryn Balint, "Seeing double: Sewer rates likely to soar," The San Diego Union-Tribune, 3/26/92, p. A1.

Neither route can open without a much better understanding of the facts of ocean pollution than existed when the City Council withdrew the waiver application in 1987. The immediate question thus becomes whether "evidence and expert opinion" can replace the gross misconceptions that existed at that time.

DEVELOPMENTS SINCE FEBRUARY 17, 1987 REVIEWED

Developments since the City Council voted to withdraw the 301(h) waiver application suggest that "evidence and expert opinion" can win in the long run. Not much happened the first year to change opinions of policy makers or of the public at large. The decision still enjoyed strong support of the public and the media. The City was busy setting up the Clean Water Program, an agency made up of city employees and employees of the engineering company engaged to develop plans for the new system, and the Metropolitan Sewer Task Force, a group of citizens appointed by the City Council to oversee the Clean Water Program. Both were admonished by the Council to limit their consideration of planning options wholly to secondary treatment. Announcements of subsequent major developments made the news, but by and large, media coverage of the issue was at a low level and generally favorable to the Clean Water Program's mission.

Interest picked up in July 1988 when EPA filed suit in the federal district court against the City to force compliance with the CWA. Negotiations underway between the City and EPA for several months over a consent decree as to what was to be done and on what timetable had ground to a halt. In the words of Mayor O'Connor, "We are the ones who refused to sign a consent decree based on the fact that there was nothing in there for dollars coming from the federal government."⁶⁶ Realization by the Council that federal help, which had been expected to cover more than half of the cost, might be forthcoming in very small amounts only, if at all, came as a shock. Statements that household sewage bills could easily triple as a result also attracted the attention of ratepayers. Councilman Bruce Henderson became the first council member to suggest that a way be found to reinstate the waiver application.

Formal opportunity for public comment on Clean Water Program activities began with the scoping meeting of September 28, 1988. As mentioned earlier, the C3 Water Committee presented the first of many statements questioning the need for secondary treatment at that meeting. Opportunities for public comment increased as planning proceeded. Media attention increased also. A press conference set up by Councilman Henderson in May 1989 marked the beginning of questioning of the decision for secondary by major newspapers and television stations in the area. Held at Scripps Pier, the press conference featured marine scientists of world

⁶⁶Marcus Stern. 1988. "U.S., State Sue City over Sewage," San Diego Union, July 28, 1988, p.A-1.

renown from Scripps Institution of Oceanography; they spoke with one voice against the need for secondary treatment to protect the ocean. The San Diego Tribune gave good coverage to the presentations and has been a strong voice in questioning the Clean Water Program since.

The Scripps Pier press conference was followed in August by a special public meeting of the Metropolitan Sewer Task Force. The purpose was to hear presentations of representatives from the Region Nine EPA office in San Francisco and of marine scientists from Scripps as to the impacts of sewage effluent on the ocean. While not billed as a debate, the media described it as such and rightly so. Most observers agreed that the scientists won by a good margin. Acceptance of the evidence presented by the experts widened. Some members of the Task Force began to question the City Council's restriction on consideration of advanced primary treatment as an option. Other members of the City Council, especially those elected after the February 17th decision, began to vote with Councilman Henderson when issues concerning the Clean Water Program were on the Council's docket. Letters to the editor questioning the need for secondary treatment gave evidence of a change of public opinion on the issue.

Support for evidence presented by the experts continued to expand and to affect public opinion accordingly. The federal district court hearings over the consent decree began to come to a head in January 1990. To the surprise of no one, Judge Rudi Brewster agreed that the City had been sorely remiss in its poor maintenance of the sewer collector system and ordered a tight schedule designed to bring it up to standard. To the surprise of many, however, he also raised serious doubts as to whether secondary treatment was in the public interest. His main concern was the high costs involved with little or no benefit to the ocean, the stated reason for its implementation.

In November 1990 Judge Brewster called for an evidentiary hearing on the issue to begin February 5, 1991. Expert witnesses from different parts of the country were called by both sides in what must have been the longest and most comprehensive hearing on a wastewater treatment project in history. On March 28, Brewster issued a memorandum decision that recognized the need for extension of the Point Loma outfall to protect health of divers in the kelp bed but found no other significant harm to ocean resources. He ordered the outfall be extended by June 15, 1994 to solve the kelp bed problem and gave the City until January 1993 to seek for alternatives to the secondary treatment as planned by the Clean Water Program. In the meantime, implementation of the plan was to be carried out according to the schedule outlined in the consent decree.

The media gave good coverage to the federal district court trial under Judge Brewster. By the trial's end, policy makers and the interested public in the San Diego region had a more realistic appreciation of the effects of sewage effluent on the ocean. In June 1991, the City Council voted unanimously to direct the Clean Water Program and the City Attorney to

investigate possibilities of reinstating the waiver application. In September 1991, the City Council voted, again unanimously, to pursue a waiver or its equivalent. The Clean Water Program Governance Advisory Group, made up of representatives from all local governments and water agencies in the Metropolitan Sewerage District and formed with the eventual intention of taking over its governance, followed soon with a unanimous vote to support the City Council's decision. In February 1992, the two major local daily newspapers, the morning San Diego Union and the afternoon Tribune, merged to form The Union-Tribune. Its editorial policy has been strongly against the secondary treatment requirement. In April, the San Diego City Council called a meeting with members of the U. S. Congress that represent San Diego County to discuss ways to work together to obtain a waiver or an equivalent change in the Clean Water Act. Unanimous agreement was reached to work to that end for at least the Point Loma treatment plant built out to its 240 MGD planned capacity.

If the national attitude changes to match that of San Diego, possibly EPA also will accept the rationality of the waiver amendment to the Clean Water Act. Statements made by William Reilly, Director of EPA, in November 1991 during a visit to San Diego suggest that acceptance is not out of the question. When asked about the study of the waiver issue underway by the National Research Council, he said, "If I saw scientific information that I though was compelling and conclusive, I would be prepared to take the consequences of that."⁶⁷

WHAT REMAINS TO BE DONE

The quote from Mark Sagoff used near the opening of this treatise bears repeating at this point. "Policy makers need to know which beliefs about facts are credible and which arguments about values are sound. The credibility of a belief (for example that the world is round) depends on evidence and expert opinion, not on the amount that people are willing to bet that it is true" (emphasis added). A majority of policy makers in the San Diego region now know which beliefs about facts are credible as far as the impact of the region's sewage effluent on the ocean environment is concerned. Nor would more than a small minority of the people living here be willing to bet that the effluent needs additional treatment before release to the ocean.

Unfortunately, a decision on reversal of the course toward secondary treatment cannot be made by local decision makers. Either EPA must revise its regulations, or Congress must clearly reinforce its intent as reflected in secondary treatment waiver amendment to the CWA in 1977. The amendment was passed only after thorough and definitive hearings on its contents; no doubt

⁶⁷Steve LaRue, "EPA boss weighs sewage issue," The San Diego Union, 11/20/91, p.B1.

exists as to the rationality of the amendment. To have Congress reinforce its intent by legislative action may be the more fruitful course to follow. Action by either EPA or Congress will require a higher level of understanding of the issue by the nation as a whole. San Diegans will perform a service to the nation as well as to themselves if they work to pass on the understanding they have gained about disposal of sewage effluent in the ocean to their fellow citizens.

SUMMARY AND CONCLUSIONS

The reasons for this treatise given in the introduction are: 1) to summarize the evidence concerning adverse environmental impacts of San Diego's sewage effluent, 2) to discuss the major reasons for the decision to go to secondary treatment, 3) to assess the environmental and economic costs and benefits of secondary alternatives presented by the Clean Water Program for Greater San Diego, and 4) to suggest rational alternatives to secondary treatment that C3 can support. Conclusions reached concerning each of the above are briefly summarized below.

ADVERSE ENVIRONMENTAL IMPACTS OF SEWAGE EFFLUENT

I began this study in 1988 with a thorough review of published research reports on two topics. They were whether: 1) Section 301(h) of the Federal Clean Water Act was based on adequate, objectively derived evidence that is, in turn, supported by the findings of research carried out since its passage in 1977, and 2) the effluent from the San Diego Metropolitan Sewerage Point Loma Treatment Plant meets all of the conditions set forth in the Act as amended. The results were affirmative on both topics. The effluent from San Diego's POTW has no significant adverse impacts on the ocean environment that will not be remedied by extension of the Point Loma outfall as planned. Secondary treatment is not necessary to protect the marine environment nor would it solve the perceived health problem for divers associated with bacteria levels in the kelp beds off Pt. Loma.

REASONS FOR THE DECISION TO GO TO SECONDARY TREATMENT

Three major reasons stand out for the decision to go to secondary treatment. They are 1) reluctance of EPA to accept and support the provisions of Section 301(h) of the federal Clean Water Act, 2) the strong value placed on resource recovery--namely, of water and plant nutrients--from wastewater held by many well-intentioned individuals in our society, and 3) strong concerns developed by the public at large based on an over-generalized assessment of marine pollution.

The reluctance of EPA to accept the waiver amendments stems from two major factors. The first is the difficulty of administering receiving water standards called for by Section

301(h) compared to technology based standards called for in the CWA before amended. The difficulties of administering receiving water standards for marine waters appears to have been severely over-estimated by EPA initially and to have not been reassessed. The second factor is the desire to subsidize resource recovery as advocated by Thomas Jorling, the EPA official primarily responsible for drafting the federal regulations for the waiver amendment (Section 301(h) to the Clean Water Act.

EPA has maintained resource recovery from wastewater as a goal since the waiver amendment was passed and has applied the requirement for secondary treatment technology to help achieve this goal. Resource recovery, especially for water, has also had strong latent support among San Diegans, but costs deterred active support until the City's secondary treatment waiver application was withdrawn. With the potential subsidy of secondary effluent as the raw material, support for water reclamation on a large scale became active and strong. This has been evidenced to me by my chastisement on a number of occasions for "shooting down water reclamation" by working for a waiver to secondary treatment for San Diego. Efforts to restrict San Diego's proposed secondary treatment waiver request to the Pt. Loma plant only suggests that water reclamation remains an important source of support for secondary treatment. Future needs beyond Pt. Loma's design capacity of 240 MGD would be met by secondary treatment plants, the costs of which would be written off to ocean protection and, in the process, provide a subsidy to reclamation. I have long advocated water reclamation, but writing off the large environmental and economic costs of secondary treatment to "protect the ocean" when the real reason is to subsidize water reclamation is unsound policy.

The strong public fears that arose during the 1980s about ocean pollution unquestionably played a major role in the decision concerning San Diego's waiver application. The fears were justified in many cases, but the causes were grossly over-generalized. A remark that Mayor Maureen O'Connor made in 1988 illustrates such gross over-generalization. To demonstrate the wisdom of the City Council's decision to withdraw the waiver application, she stated, "Are we going to continue to have our water fouled to the point that we have needles and rats washing up on our beaches?"⁶⁸ Needles and rats do get through the sewage collector system to the Point Loma plant, but the chances of them getting into the effluent discharged from the plant are next to nil. Since 1988, the Mayor and most other citizens of San Diego have learned enough about wastewater collection, treatment, and effluent discharge to avoid such over-generalization. To educate the rest of the country to like levels will take time and effort, but doing so is essential to assure rational decisions concerning wastewater treatment

⁶⁸Michael Abrams. 1988. "Panel Urges New Try for Waiver of Sewage Order," San Diego Union, 4/8/88. p. B-1.

technologies needed under different conditions.

ENVIRONMENTAL AND ECONOMIC COSTS COMPARED

Remaining with the present system expanded to its design capacity of 240 MGD will impose no significant adverse impacts on the marine environment. The proposed secondary treatment system will have one significant adverse impact--interference with divers because the Tijuana outfall will be in water too shallow to permit adequate initial diffusion. To remain with the present system to 240 MGD will avoid the one ocean impact and all of the considerable adverse impacts to terrestrial and atmospheric resources associated with the proposed plan. These conclusions appear in the Joint Environmental Impact Report/Environmental Impact Study approved by the EPA and the San Diego City Council.

The present system built out to design capacity can suffice well into the next century if not to 2050, the end of the current planning period for the wastewater system. The water conservation program instituted during the water shortage of 1991 indicates the effects that a permanent conservation program can have. Wastewater flow was reduced from 190 MGD prior to the 1991 drought to 170 MGD from early summer of 1991 through the time of writing (May 1992). The 170 MGD includes 13 MGD from Tijuana. Completion of the plant under construction for that metropolis later in this decade gives in essence, a current flow of 153 MGD. The volume can be further reduced by measures, such as retrofitting existing homes with low flow toilets and shower heads, that assure a permanent reduction in water use affecting wastewater flows. The Pt. Loma plant quite possibly can be enlarged beyond its design capacity with no adverse impacts; the current unused capacity provides ample time to study the possibility. In any event, the issue should be based on objective assessment of facts at the time the decision needs to be made, not a current presumed need to subsidize water reclamation.

A comparison of the economic impacts of the two plans brings out similar irrationalities. The proposed plan is estimated by the Clean Water Program to cost about \$5.6 billion with another \$0.4 billion needed to build a conveyance system for reclaimed water. Most comments on this estimate consider it conservative. The present system, including the proposed outfall extension, can be brought up to standard and expanded to design capacity for a fraction of this amount. Operation and maintenance costs also will be far lower than for the system proposed by the Clean Water Program of Greater San Diego.

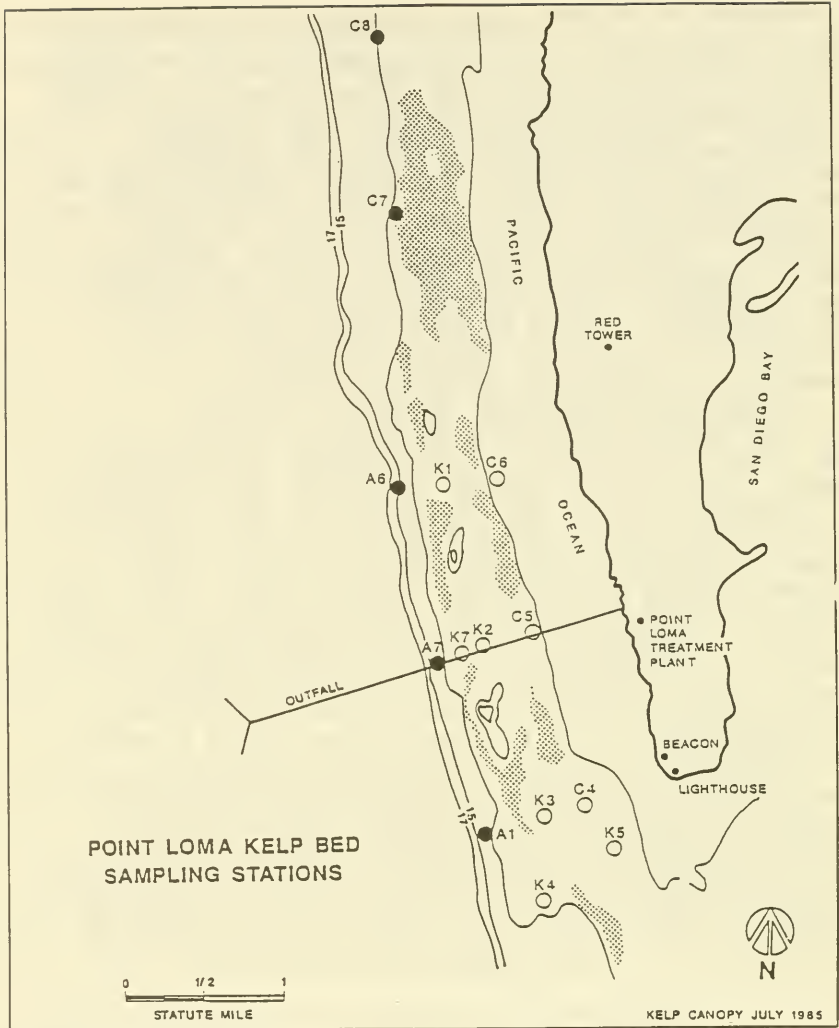
RATIONAL ALTERNATIVES TO SECONDARY TREATMENT

The public welfare and the well-being of the natural environment is far better served with the present system than it would be with a secondary treatment system. An objective assessment of the hard evidence can lead to no other conclusion.

Improvements can be made. Some toxic materials still get into the wastewater; neither primary nor secondary treatment removes them in their entirety. Some get in from homes; care on the part of everyone using the system is the best answer here. The source controls for commercial and industrial establishments called for by the federal Clean Water Act admittedly are difficult to implement. The controls are reasonable. Keeping harmful compounds out of the wastewater stream is much cheaper than removing them from it. Ample funds should be made available and used to assure full implementation of source controls by all establishments covered by the Clean Water Act. Additional research on disposal of effluent in the ocean environment also is desirable. And finally, conservation of water to reduce the volume of wastewater ranks high among beneficial measures that can be taken by all users: residential, commercial, industrial, and institutional. Use of water to transport wastes is a legitimate use, but we use far more for this purpose than is necessary. To reduce or eliminate this excessive use is to decrease impacts on natural resources as a whole.

My final recommendation is that we always begin environmental evaluation of any project with a holistic view. This view begins with the earth as one system. Humans are within the system, not apart from it. Waste disposal provides a good example of the wisdom of doing so. The oceans cover 71 percent of the earth's surface. Most of the materials defined as wastes in wastewater have been processed and recycled by the water bodies throughout time. We overloaded many of our bodies of fresh water with more wastes than they can handle. We accelerate natural processes with secondary treatment to relieve the pressure on fresh waters. As yet, the ocean off San Diego needs no help from secondary treatment systems to handle effluent such as that now discharged from the Pt. Loma treatment plant. The same conditions hold for many coastal cities throughout the world. Nutrients and energy in the effluent are recycled in a more ecologically acceptable manner than they would be with secondary treatment. The world ecosystem as a whole is better off; human beings as part of it are better off also.

William Reilly promised to ask Congress for permission to institute a "multi-media" or "cross-media" approach to waste disposal shortly after his appointment by President Bush as Director of the Environmental Protection Agency. Simply put, this means disposal of the wastes in the medium--land, air, or water--where they do the least harm or for some, the most good. The final decision in many cases requires study and assessment by experts. It behooves all of us to make sure that positions we take fit the objectively derived evidence in its total context. The world will be a better place to live if we do so.



SOURCE: Engineering -
Science.

State Ocean Plan
Compliance
Outfall Extension Project

Point Loma Kelp Bed Sampling Station



**Surfrider
Foundation**

Honorable Gerry E. Studds, Chairman
Subcommittee on Environment and Natural Resources
U.S. House of Representatives
Room 1334 Longworth Building
Washington D.C. 20515-6230

July 8, 1993

Dear Congressman Studds,

My name is Dr. Scott A. Jenkins. I have been a researcher in Coastal Processes at the Scripps Institution of Oceanography since 1980. I have also served as the Environmental Director of the Surfrider Foundation since 1990. I have conceived and implemented the first all volunteer surfzone water quality monitoring program called "The Blue Water Task Force".

Based upon this experience and background, I report to you that there is no existing water quality data which implicates the discharge of primary treated sewage with beach closures when the effluent is discharged through a properly functioning ocean outfall. Instead, more than 2,000 beach closures annually are attributable to untreated urban runoff and raw sewage from leaking sewer infrastructure. Most of this kind of non-point source pollution is discharged directly on to the beach through storm drains, who's seemingly benign flow attract young children. Furthermore storm drain discharges are diluted relatively slowly in the surfzone due to the shallow water depth and shoreward directed wave energy, which keeps this pollution pinned against the shoreline.

In its present form the Clean Water Act (CWA) is ineffective in controlling surfzone pollution from urban runoff and sewer infrastructure leaks. In fact, by forcing cities like San Diego to divert billions of dollars toward secondary treatment levels, the CWA delays effective solutions to the more significant threats to near shore water quality, namely non-point source pollution. In my view the more urgent need is to repair and upgrade the basic plumbing of the sewer infrastructure so that all the sewage makes it to the treatment facility. In addition the capacity of the primary treatment level must be increased 4-

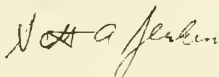
discharged offshore through ocean outfalls where the dilution rates are high.

Without these structural remedies the only short term relief from non-point source pollution will follow from "Best Management Practices" (BMP's) as outlined in section 319 of the CWA. BMP's are presently not working because they rely on voluntary compliance and because local agencies have no standards with which to define NPDES storm drain permit levels. There will be no such standard until Congress invests in additional research to determine what the spectrum of pollutants commonly are in storm drain runoff.

Our experience with the present system of self monitoring in water quality testing to insure compliance with NPDES permit levels, is that this system allows polluters to select testing schedules for which discharges are minimal. Only a system of remote monitoring by a dispassionate third party can eliminate this kind of aliasing. Furthermore, most testing is done in the neighborhood of offshores outfalls, where people are not swimming. Insufficient water quality monitoring resources are directed towards shore stations at popular beaches. Since surfzone pollution is due to episodic non-point source runoff events, the likelihood of infrequent shore testing providing adequate warning to bathers is remote. In addition, there needs to be a uniform archival format for reporting water test results so that screening for violations can be automated by computer. Under the present non-uniform reporting arrangements, thousands of violations lie unnoticed in EPA files. A good example of this was brought to light by the Surfrider Foundation litigation against 2 pulp mills for over 40,000 previously unnoticed violations of the CWA.

Finally, section 404 of the CWA needs to be strengthened to protect our existing wetlands. These are Natures natural urban runoff treatment systems. In fact Congress should give consideration to wetlands restoration as a remedial approach to the urban runoff problem.

Sincerely,



Scott A. Jenkins, PhD
Environmental Director



AMERICAN OCEANS CAMPAIGN

TESTIMONY
OF
AMERICAN OCEANS CAMPAIGN

BEFORE THE

UNITED STATES HOUSE OF REPRESENTATIVES

SUBCOMMITTEE ON ENVIRONMENT AND NATURAL
RESOURCES

ON

CLEAN WATER ACT AND CLEAN WATER ISSUES FACING
SAN DIEGO

JULY 8, 1993
9:30 A.M.

PRESENTED BY:
LISA WEIL
POLICY DIRECTOR
AMERICAN OCEANS CAMPAIGN

BOARD OF
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Good Morning. My name is Lisa Weil and I am the Policy Director for the American Oceans Campaign. The American Oceans Campaign (AOC), with offices in Santa Monica and Washington, D.C. is dedicated to conserving and enhancing our nation's oceans and coastal resources. ¹ I wish to thank Chairman Studds and the other members of the Committee for inviting us to testify on this very important issue.

INTRODUCTION

Since the original Federal Water Pollution Control Act (Clean Water Act) was signed into law its provisions have been revised on numerous occasions. With each reauthorization, Congress has strengthened protections for our coasts from pollution. As the 103rd Congress is faced with this same daunting task, we believe that the critical state of our nation's aquatic ecosystems and our global environment demand passage of even greater protections.

Citizens of this nation are becoming increasingly aware of the value of our earth and its abundant, yet limited, resources. According to a 1991 Gallup poll, approximately two-thirds of the U.S. public are "greatly concerned" about the contamination of drinking water and the pollution of our lakes, rivers, and beaches.² Even in light of the extreme financial restrictions currently facing our state and federal treasuries, the public has consistently called for increased environmental protections, while acknowledging the high cost of some of these programs. Similarly, the Wirthlin Group conducted a poll in July of last year which found that 80 percent of the U.S. public think "protecting the environment is so important that requirements and standards cannot be too high, and continuing environmental improvements must be made, regardless of cost."³

Clearly, the public sees the potentially disastrous short and long-term environmental, social and economic costs associated with delaying the implementation of environmental protections. They realize that it is more costly to deal with environmental problems with a band-aid approach than it is to address them through a comprehensive and strategic planning process aimed at cleaning up and preventing pollution. Therefore, as you reauthorize the Clean Water Act (CWA), we encourage you to move ahead

with confidence that the public solidly supports strong and enforceable legislation.

COASTAL POLLUTION

Two months after the last reauthorization of the CWA in 1987, the Office of Technology Assessment ("OTA") published an oft cited report that documents the severe threats to our coasts posed by pollution. ⁴ The report highlights the ecological and economical significance of our aquatic ecosystems. From an economic perspective, it explains that these waters harbor food species for human consumption (i.e., fisheries, coastal waterfowl, and marine plants) and it points out the impact of pollution on the tourism and recreational industries. Other commercial interests such as shipbuilding, fish processing and retailing, pharmaceutical research and development, and production of other common consumer goods are also affected. ⁵

In addition, each of these economic activities are adversely affected by waste disposal. The report estimates that industry discharges 4.9 trillion gallons of wastewater annually and that 3.6 trillion gallons of wastewater from sewage treatment plants are dumped into our coastal waters each year. ⁶ One of the report's conclusions is that "estuaries and coastal waters around the country receive the vast majority of pollutants introduced into marine environments. As a result, many of these waters have exhibited a variety of adverse impacts, and their overall health is declining or threatened."⁷

Millions of fish die annually from pollution and lack of oxygen - millions more are rendered inedible by dangerous toxics. Swimmers are exposed to bacteria and viruses from sewage and sludge discharges. Estuaries are filled with toxics that threaten the biological life cycles of both marine organisms and wildlife. The oceans are facing increased pressure from coastal development and industrialization. Coastal currents transport pollutants along the shoreline where they accumulate in organisms and are sometimes transferred to others in the food chain. Yet, we are here today to express our hope that with the strengthening of the CWA, the situation can be changed for the better.

SAN DIEGO ISSUES

California's population has rapidly increased to 28 million people over the past few years. Of this number, 67 percent live in the coastal counties, and 80 percent live within an hour's drive of the coast. Our precious

California coastline is also an incredible attraction for tourists from all over the world. In 1992 there were over 60 million visitors to Los Angeles County beaches and there were over 17 million visitors to San Diego beaches.⁸

Although progress has been made, substantial pollution still exists along the entire coast of California from a variety of sources including sewage and industrial wastewater discharges, urban runoff, agricultural runoff, and contaminants in storm drains. The greatest coastal pollution incident in 1992 occurred right here in San Diego when a break in the Point Loma sewage line spewed over 180 million gallons a day into the ocean and closed down the beaches for over two months. And in 1991, San Diego County reported 51% of all of California's beach closings and advisories.

The fundamental premise of the Clean Water Act is to make unlawful the discharge of any pollutant from a point source by any person. The decision to clean up pollutants prior to discharge rather than to dilute the effluents in order to achieve ambient water quality standards implements the belief that "dilution is not the solution to pollution."

Full secondary treatment may not be the right technology for everyone. When Section 301 (h) was added to the Clean Water Act, the intent was that each situation would be individually addressed and analyzed and if certain requirements were met, especially that "the discharge of pollutants in accordance with such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational activities, in and on the water", the Administrator, with the concurrence of the State, may issue a permit to modify the requirements. In Orange County, after extensive research and analysis, a 301(h) waiver was granted to the Sanitation District. The Orange County Sanitation District will probably get a second waiver from the EPA by the end of the year. The EPA denied waivers to San Diego and the Los Angeles County Sanitation District because it specifically determined that the requirements were not met to justify a waiver from going to full secondary treatment and complying with the law as specified in the Clean Water Act. The plants were not meeting the requirements of the State Ocean Plan (California's CWA for coastal waters) and/or failed to demonstrate that a balanced indigenous population (BIP) existed outside the zone of initial dilution (ZID).

Millions of dollars have been spent by EPA and the POTWs on technical consultants to demonstrate that the marine life is not impacted by sewage sludge receiving less than full secondary treatment. The EPA spent over a dozen years studying the issues before finally denying the Los Angeles County Sanitation District's application for a waiver for their Carson plant. The coastal waters off of Southern California are some of the most studied in the world. Comparisons between marine communities in polluted waters near sewage treatment plants versus reference areas have demonstrated in numerous cases that the marine communities are degraded near outfalls. Examples of the problems are lower species diversity, very different assemblages of animals, high densities of animals like capitellid worms found in areas of high organic enrichment, and low densities of certain animals like brittle stars that are very common at reference sites.

What does full secondary get you? Full secondary is very effective at degrading many carcinogenic organics including the chlorinated phenols and the PAHs (polynuclear aromatic hydrocarbons - the most toxic hydrocarbons in petroleum). Also, full secondary improves solids and pathogen removal efficiencies so the effluent has less toxics and less microbes that can cause people to get sick.

Responding to the concerns about more sludge and more energy use - full secondary treatment does indeed produce more sludge, but environmentalists consider sludge a resource for beneficial use. If the POTW has an effective industrial waste program, then the sludge should have low heavy metal and pesticide concentrations. The sludge can be used for landfill cover after mixing with cement like material, land application for non-human food chain crops, energy recovery, and composting to provide much needed soil amendment for farmers and the public.

Many people in southern California would argue that full secondary treatment is not enough sewage treatment to alleviate their environmental and public health concerns. In southern California we import more than 50% of our water from locations such as the Colorado River Mono Lake and the San Francisco Bay /Sacramento River Delta area. The result has been severe ecological impacts in those areas. Species have become endangered in the Delta Bay because of water supply problems. The Colorado River Delta at the top of the gulf of California basically no longer exists. The dust and ecological problems in the Mono Basin have led to interminable litigation.

Talk about the need for Integrated Coastal Management as specifically addressed in the report issued by the National Research Council in April of this year. One can't have Integrated Coastal Management in Southern California unless you have a comprehensive water reclamation and water reuse effort. We need more tertiary treatment plants so we can reduce our need for imported water, increase the reliability of our water supply, and reduce our impact on ecologically sensitive areas throughout the Southwest. The reauthorized Clean Water Act must have grant or loan funds available for building water reclamation plants and the infrastructure to deliver the reclaimed water. In Los Angeles County alone, approximately 150 million gallons per day of tertiary treated water is dumped into storm drains that flow to the Pacific. That is a crime!

Another important issue that must be highlighted in the spirit of an Integrated Coastal Management approach is reducing the total pollutant loads to our coastal waters. Why does the EPA allow POTWs to chlorinate their effluent to meet the bacteriological requirements of their NPDES permit? Chlorine is used because it is a disinfectant. By nature, it is extremely toxic and forms chlorinated organic chemicals that are highly carcinogenic. The chlorination byproduct issue is driving changes in the Federal Safe Drinking Water Act yet it has been completely ignored in the Clean Water Act. POTWs aren't even required to monitor byproduct formation or the toxicity of their effluent after chlorination, yet the EPA and Congress have chosen to ignore this issue.

CONCLUSION

We are very pleased that the National Research Council Report advocates the approach of Integrated Coastal Management. AOC supports the need for pollution prevention, conservation, wastewater reclamation and better identification of pathogens through research and testing. It must be expressly pointed out, that this report takes no position on exemptions for any particular municipality, and we concur that none is justified. The mandates of the Clean Water Act must be complied with and hopefully strengthened in the reauthorization process. Any unjustified deviation from compliance with the law, specifically from being exempted from going to secondary treatment in San Diego must not be tolerated. This would have the effect of undermining the very purpose of the Act. The EPA has specifically determined that the discharge at issue harms biological resources and impairs recreational uses and therefore, it would be inappropriate to approve any waiver or exempt San Diego from compliance with the Clean Water Act.

We hope that we have highlighted some of the concerns and problems associated with ignoring protection of our California coastal waters. We encourage you to do all that is within your power to assure that the current provisions of the Clean Water Act are strengthened by your Committee.

Thank you for soliciting our views on this important issue. We appreciate the Committee's attention to the problem of coastal pollution, and look forward to working with you to assure that the Clean Water Act is strengthened during this reauthorization process.

¹ AOC is a non-partisan, non-profit organization founded in 1987 and dedicated to the restoration and preservation of the world's oceans. Our efforts are rooted in the premise that the earth's environments is dependent upon healthy oceans. Our mission is to work to protect the vitality of coastal waters, estuaries, bays, wetlands, and deep oceans. We accomplish this goal by educating the public and decision-makers on the need to protect our marine resources. We focus on strengthening public policy to protect our marine resources, and we believe that strong grassroots input and sound scientific information are the key ingredients to making effective public policy.

² Americans Report High Levels of Environmental Concern, Activity, Graham Hueber, The Gallup Poll News Service (April 1990).

³ Environmental Concern Still High after Rio Summit, Christine Keilpinski, The Wirthlin Group and Susan Wysoki, Hill and Knowlton; the Wirthlin Report (July 1992)

⁴ Wastes in Marine Environments, U.S. Congress, Office of Technology Assessment (April 1987)

⁵ OTA Report, at 39-44.

⁶ Id. at 70.

⁷ Id. at 3.

⁸ Testing the Waters III, Natural Resources Defense Council Report, June 1993, at 32.

TESTIMONY OF
TUDOR T. DAVIES
ACTING DEPUTY ASSISTANT ADMINISTRATOR
OFFICE OF WATER
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES
OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES
U.S. HOUSE OF REPRESENTATIVES

July 8, 1993
San Diego, California

My name is Tudor T. Davies, and I am the Acting Deputy Assistant Administrator for Water at the U.S. Environmental Protection Agency (EPA). The Office of Water has responsibility for implementing, among other things, the National Pollutant Discharge Elimination System (NPDES) program and secondary treatment requirements for publicly-owned treatment works (POTWs) under the Clean Water Act (CWA).

With me today is Ms. Walker Smith, Assistant Chief of the Environmental Enforcement Section at the Department of Justice (DOJ) in Washington, D.C. Ms. Smith may be known to some of you here today since she manages all civil enforcement cases brought by EPA's Region IX office in San Francisco and EPA's Region IV (Atlanta) office. Previously, she served as senior trial attorney for DOJ for all Region IX cases. Ms. Smith is familiar with the San Diego wastewater treatment case and will be pleased to answer any questions you direct to her.

I appreciate the opportunity to discuss with the Subcommittee CWA issues related to wastewater treatment, and the recently released National Academy of Sciences' (NAS) Report titled "Managing Wastewater in Coastal Urban Areas." I will also

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address the issues you raised in your letter of invitation concerning San Diego's situation specifically.

BACKGROUND

Current CWA Secondary Treatment Requirements

As most of you are aware, the CWA requires all sewage discharges to meet, at a minimum, secondary treatment standards [CWA Section 301(b)(1)(B)]. These standards require dischargers, such as San Diego, to treat their sewage to remove at least 85% of the suspended solids and biochemical oxygen demand (BOD) from their wastewater. Concentration of suspended solids and BOD in the wastewater are not to exceed 30 milligrams per liter (mg/l) on a monthly average basis. Also, discharged wastewater must meet a pH level between six and nine. Of course, municipal dischargers are also required to meet more stringent limits when necessary to comply with State water quality standards.

Secondary Treatment Benefits

Since the enactment of secondary treatment requirements in 1972, water quality in the U.S. has improved dramatically. The upgrading of POTWs to secondary and advanced treatment has helped restore many of the nation's waterways to meet the fishable and swimmable goals of the CWA. This improvement has come despite rapid population growth and industrial development during the same time period.

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Secondary treatment provides substantial benefits for dischargers to ocean waters. Scientific literature establishes that secondary treatment (with or without disinfection) is much more effective than primary treatment in the removal of bacteria and viruses from sewage influent. Secondary treatment also removes a greater amount of toxics from the discharge, in particular, toxic organics. Secondary treatment also reduces the negative effects of sewage discharges to biological communities surrounding the discharges. I will elaborate on these environmental benefits when discussing San Diego specifically.

EPA is studying the benefits of secondary treatment at a marine discharge site. In Rhode Island, ambient and whole effluent toxicity studies have been conducted at the East Greenwich Sewage Treatment Plant in East Greenwich, Rhode Island. These studies were conducted before, during and after the Greenwich facility's upgrade to secondary treatment. A comparison of results indicates that the effluent is less toxic and the quality of the receiving water near the discharge outfall has dramatically improved since full implementation of secondary treatment at the plant.

The 301(h) Waiver Program

The Clean Water Act provides an opportunity to seek a waiver from secondary treatment requirements. The waiver provision section 301(h) of the Act, was enacted in 1977 in response to arguments by West Coast and Alaskan sewage dischargers that

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secondary treatment was not necessary to protect marine waters due to a high energy environment with rapid transport and dispersion of waste. To qualify for a waiver, a municipality needed to show, among other things, that the municipalities' discharge protects a balanced indigenous population of biological communities, meets water quality standards, and protects recreational uses [section 301(h)(2)]. The statutory deadline for 301(h) waiver applications was December, 1982 [section 301(j)].

EPA received a total of 208 applications, among which was the application of the City of San Diego for its Point Loma plant. Currently, there are 39 approved applications, 76 denied (of which 2 are still in evidentiary hearings), and 9 pending. Eighty-four applicants have withdrawn their applications, including San Diego. Most of these applications, including San Diego's, were withdrawn prior to EPA reaching a final determination on the application.

The 301(h) program has been controversial since its inception. Many times the program becomes a focal point for debate on whether technology-based controls are necessary. Section 301(h) decisions are technically complex and resource-intensive. The program is difficult to implement--in part due to the difficulty in obtaining data; in part due to scientific uncertainties on how to interpret the data and the severity of impacts to the ecosystem; and in part due to the intense scrutiny under which the program operates. Although section 301(h) has

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helped move the relevant ecological science forward, the scientific data has lead to unending debates on 301(h) applications regarding the extent of the threat to marine waters and the level of treatment needed. The consequence of these debates is at times a delay in compliance with the CWA. This is unfortunate. EPA remains convinced that secondary treatment, as required by the CWA, is environmentally beneficial to marine ecosystems.

NAS Report

The recently-released National Academy of Sciences report titled "Managing Wastewater in Urban Coastal Areas" (Report) makes a number of significant findings and recommendations, many of which will be useful to EPA in our efforts to protect coastal waters. For example, the NAS Report calls for an integrated coastal management approach to management of wastewater and other pollutant sources. EPA supports this concept, as evidenced by our National Estuary Program and water quality management program, including the total maximum daily load (TMDL) program.

The NAS report concludes that a technology-based approach, in some cases, results in overprotection and, in some cases, results in under protection. The Report therefore contends that each situation should be judged on its own merits--a risk-based approach to water pollution control. EPA is concerned that the Report may call into question the role and necessity of secondary treatment standards or other national technology-based standards.

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As is clear from the remarks I have just made, the technology-based approach which Congress established in 1972 for dealing with municipal and industrial dischargers has been essential to the gains made under the CWA to improve water quality. Without national minimum technology standards, progress towards improved water quality would significantly slow. Congress understood this during their debate on passage of the Clean Water Act in 1972. After witnessing much technical and scientific debate and testimony regarding national standards setting versus case-by-case decision-making, Congress decided that an Act weighted towards national standards was appropriate.

Case-by-case determinations made on individual dischargers often result in different interpretations of biological data. EPA has encountered infinite biological debate among scientists concerning how to interpret the data, what the data means for the ecosystem in question, and what steps should be taken to address the problems. Often, these different interpretations result in different responses to similar water pollution problems.

Implementing regulatory standards on a case-by-case basis for permit decisions would be highly resource-intensive and extend existing time frames for permit decisions and issuance. In addition, when regulatory standards are set on a case-by-case basis, constantly subject to revision, effective enforcement is virtually impossible. Violators will argue that they should have the opportunity to seek relief in the next planning cycle.

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It is important to make one other point regarding the NAS Report. The Report does not make any findings nor draw any conclusions regarding the merits of San Diego's case, or any other particular municipality. The Report is national and broad-based in scope and should not be interpreted as recommending that certain specific cities need not upgrade to secondary treatment.

SHOULD SAN DIEGO BE ACHIEVING SECONDARY TREATMENT?

I would like to turn now to the subcommittee's request that I briefly address the issue of what San Diego should do in the next few years to meet the goals and objectives of the Clean Water Act.

History

In 1986, EPA tentatively determined that San Diego, and more specifically, San Diego's Point Loma plant did not meet the environmental criteria for a 301(h) waiver. EPA concluded that San Diego's discharge was damaging the indigenous biological communities, and did not protect recreational uses of the Point Loma kelp beds. The plant caused frequent exceedances of California's water quality standards needed to protect body contact recreation.

Subsequent to EPA's 1986 tentative decision, San Diego elected to withdraw its 301(h) waiver application. It has yet upgrade its waste water treatment to meet CWA requirements. In 1988, the U.S. and the State of California filed suit against San

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Diego to compel compliance with secondary treatment standards and to address other CWA violations. In 1990, San Diego entered into a consent decree with the U.S. and California which included a plan to maximize waste water reclamation and upgrade to secondary treatment. San Diego selected this approach to aid in addressing its long-term water supply problems. EPA strongly supported San Diego's decision to maximize reclamation.

To address San Diego's long standing violations of water quality standards to protect recreational users of kelp beds, the decree required the City to remedy the water quality standards violations and the City is extending its outfall. The outfall is currently under construction. The court is requiring completion of the outfall extension by August, 1994. In the interim, the court ordered San Diego to quarantine the kelp beds from recreational diving if violations of water quality standards occur more than 25% of the time.

In May, 1992, San Diego adopted a new approach. Although San Diego is continuing construction of the outfall extension, it is no longer planning to build five of the six reclamation plants, the proposed new secondary treatment plant, nor the upgrade of Point Loma to secondary treatment. The new approach does not comply with the secondary treatment requirements of the CWA. Neither does this approach comply with the terms of the consent decree. Thus, as you are aware, EPA and the State of California have continued their enforcement efforts

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It should be noted that, last month, San Diego informed EPA and the Department of Justice that water quality standards violations are occurring in the kelp beds more than 25% of the time. The kelp beds were quarantined on June 18, 1993.

Environmental Benefits of Secondary Treatment for San Diego

The CWA requires that San Diego upgrade to secondary treatment. Although this is required by law, it is also appropriate to ask what environmental benefits are obtained when San Diego upgrades to secondary treatment. The answer is that secondary treatment would make a large difference in three environmentally-important areas--increased removal of viruses and other pathogens, reduced impacts to the benthic communities in the vicinity surrounding San Diego's discharge, and increased removal of toxic pollutants. EPA considers each of these to be significant environmental issues for San Diego, and believes that secondary treatment will lead to substantial improvement in the water quality in each of these areas.

Secondary treatment is far more effective in removing viruses and other pathogens from sewage than primary treatment. Primary treatment can be expected to remove roughly 20% of the viruses in sewage. San Diego may produce slightly better removal because of its use of chemicals to enhance settling. In contrast, secondary treatment will remove 90 to 95% of these viruses. Secondary treatment enhances virus and bacteria removal because most microbial pathogens are significantly associated

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with the solids that are removed during treatment. Sewage pathogens can cause a variety of illnesses, the most common of which is gastroenteritis. Improved removal of pathogens is particularly important for San Diego since San Diego does not disinfect its wastewater. This was one of the reasons for San Diego's violation of California water quality standards and part of the basis for EPA's tentative denial of San Diego's 301(h) waiver application.

Secondary treatment also will greatly reduce the impact of San Diego's discharge on the biological communities in the vicinity of the Point Loma outfall. Sewage discharges can affect a variety of biological communities. The clearest impact to document is that of the benthic community, those organisms that dwell on the sea floor and in the sediment.

San Diego's discharge has significantly altered the benthic community for roughly a two-square mile area around the outfall. In this area, pollution sensitive species are greatly reduced in abundance or absent, and pollution tolerant species are enhanced in abundance. In fact, in a two-mile area around the Point Loma discharge, the dominant species has been virtually eliminated from the benthic community. Alterations to the benthic community, it is safe to say, will affect the ecosystem.

Moreover, the changes to the benthic community are indicative of the potential for adverse impacts on fish and shellfish communities in the area. Actual impacts to the fish and shellfish community have not been documented, and are very

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difficult to reliably document. It is appropriate, however, to look at the benthic community as an early warning that adverse impacts may be occurring in other communities in the ecosystem.

Finally, secondary treatment is considerably more effective than advanced primary treatment in removing many toxic organic pollutants and some metals, such as copper, cadmium and lead, from sewage. This improved removal occurs in large part because the biological processes in secondary treatment can break down a wide variety of toxic organic pollutants. Therefore, these pollutants are not simply transferred from wastewater to sludge, but rather are eliminated entirely.

EPA also has data that show that sediments at stations nearest to San Diego's outfall have heightened levels of toxic pollutants including copper, mercury and lead. When San Diego complies with CWA requirements, the removal of toxics will help to minimize the risk of toxics contamination in these sediments.

San Diego's proposed new approach, the outfall extension, may eliminate some environmental problems, but it will not address them all. For example, the new discharge location will help alleviate San Diego's water quality violations in the kelp beds. However, San Diego will still be discharging pathogens, and people do dive beyond the kelp beds.

EPA does agree that the outfall extension will significantly reduce the risk of human health impacts from direct contact with pathogens. However, the outfall extension will not aid in toxics removal. EPA also has no data to suggest that impacts on the

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biological community will be reduced. The precise magnitude of impact on pollution-sensitive species cannot be predicted at this time, however it is likely that impacts to the dominant benthic species at the new outfall location will be similar to the impact at the current location point.

In sum, EPA believes that there are environmental benefits to secondary treatment. In addition, given San Diego's water supply issues, EPA still believes that water reclamation should be a priority for San Diego. In this area where water supplies are limited, an integrated waste water management approach such as the NAS Report envisions should emphasize water reclamation as part of an overall waste water management plan.

CONCLUSION

It is important to note the precedent setting effect a waiver for San Diego might have on other municipalities. San Diego has raised the issue of new secondary treatment requirements for deep ocean discharges. Such new requirements, however, could apply to municipalities other than San Diego. San Diego could be just the first of many municipalities, and not just coastal municipalities, requesting a waiver outside the 301(h) program. This is a point that bears remembering as we discuss the particulars of San Diego. In essence, re-opening 301(h) or allowing a less stringent set of treatment requirements for deep ocean discharges would allow severe backsliding from secondary treatment requirements and consequently, a reversal of

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some tremendous gains that have been made over the past two decades in water quality improvement.

Secondary treatment has yielded great environmental benefits, providing great improvements to our nation's water quality over the past 20 years. Since passage of the CWA, over 93% of discharging municipal facilities have achieved at least secondary treatment. Over 40% of these have achieved greater than secondary treatment. EPA supports the continuation of secondary treatment requirements. And we look forward to San Diego joining the numbers of facilities across the U.S. who have achieved secondary treatment and who are enjoying its environmental benefits.

This concludes my testimony, and I would be pleased to respond to any questions you might have.

* * *

STATEMENT OF MIA TEGNER, PH.D.
RESEARCH MARINE BIOLOGIST, SCRIPPS INSTITUTION OF OCEANOGRAPHY
UNIVERSITY OF CALIFORNIA, SAN DIEGO

SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES
OF THE U. S. HOUSE OF REPRESENTATIVES COMMITTEE ON
MERCHANT MARINE AND FISHERIES

Field Hearing on the Clean Water Act, July 8, 1993

Introduction

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to testify today on Clean Water Act issues relevant to San Diego.

I am Mia Tegner, Research Marine Biologist at Scripps Institution of Oceanography, University of California, San Diego. Since completing my Ph.D. at Scripps in 1974, my research has focused on the ecology of kelp forests with studies of the natural history and population dynamics of many organisms in this community. I have worked on abalones and sea urchins, the kelps themselves and how they are affected by physical processes such as El Niños, human fisheries, and in 1992, sewage from the Point Loma outfall break. My knowledge of local oceanography and two decades of research in the Point Loma kelp forest led to my participation in the debate over the proper level of treatment for San Diego's sewage. This includes testifying as an expert witness on the health of the marine environment in the ongoing EPA suit, and appointment to the Oversight Board for the Clean Water Program of San Diego.

San Diego's Oceanographic Setting

San Diego's sewage is discharged off a straight line, open coastline. Coastal currents and tides provide high energy mixing processes. In contrast with the broad, shallow shelf characteristic of much of the United States, we have a very narrow shelf with very deep water close to shore. The present outfall is 2.5 miles long and discharges in 220 feet. When the outfall extension is completed in a few months, the discharge will be 4.5 miles offshore in 320 feet, one of the longest and deepest outfalls

in the world. The initial dilution, the most effective phase of mixing, will be increased from about 113:1 to a most probable number of about 310:1. With the extended outfall, the top of the waste field will be confined to deeper water, greatly minimizing the chance of encounter with scuba divers along the outer edge of the forest. Because of this tremendous dilution and mixing potential, biochemical oxygen demand (or BOD) of the wastewater, a serious issue in fresh waters or marine waters of limited volume, is simply not a problem off San Diego. Narrow shelves, which lead to high mixing between coastal waters and the deep ocean, are typical of most of the West Coast and many Hawaiian Island sites. The NRC Report concluded that ocean outfalls should be considered as an integral part of the treatment process. San Diego's long, deep outfall combined with local oceanographic conditions optimize this part of the treatment process, and the result is so effective that secondary treatment is not needed to protect the ocean.

Research to support my conclusion that the ocean environment offshore of San Diego presents opportunities for a different approach to waste treatment falls into four categories: the kelp forest, the sand bottom community, coliform bacterial levels, and the effects of the 1992 outfall break.

Effects of Sewage Discharge on the Kelp Forest Community

Paul Dayton and I have studied the Point Loma kelp forest for the last two decades, and have looked for evidence that sewage discharge has harmed the health of the kelp community. The evidence is strong that sewage contributed to the decimation of the Point Loma kelp forest in the 1950s and early 1960s when raw or poorly treated sewage was discharged into San Diego Bay and tidal flushing of the Bay impacted the kelp forest. Since that time the deep water outfall has been constructed and sewage treatment has improved with advanced primary treatment and source control programs. Today there is no clear outfall effect on the Point Loma kelp forest. The forest has fluctuated enormously in size over the last decade in response to natural disturbances such as El Niño events and the 200 year storm of 1988. Ecologists use rate of recovery as a measure of the health of a community. We have had two very strong El Niño events in recent years, both catastrophic scale disturbances which caused massive kelp mortality. It took four years of normal oceanographic conditions after the 1957-59 event before significant recovery was observed in 1964; in contrast we had significant recovery within a year of the 1982-84 El Niño--thus the community was much

healthier in the 1980s. Furthermore, the predominant currents flow to the north, and the healthiest part of the kelp forest is in the central and northern regions of the bed.

Effects of Sewage Discharge on the Soft Bottom Community

Another issue is whether the sand bottom community in the vicinity of the outfall is degraded. The City of San Diego operates an extensive monitoring program in this habitat and there is considerable evidence that this community is healthy. There are no anoxic sediments, no evidence of fin rot or other pollution indicators, essentially all of the normal species are there at normal densities, and there is no evidence that either the bottom community or the water column are adversely affected. (Details are appended.)

Effects of Sewage Discharge on Coliform Levels

While there are no ecological effects and probably no health effects, coliform bacteria counts on the outer edge of the Point Loma kelp forest are out of compliance with the California Ocean Plan. This problem will be solved with the extension of the Point Loma outfall which is presently under construction.

The Sewage Spill as a Worst Case Scenario

The massive sewage spill during the two month outfall break of 1992 offered a chance to study a worst case scenario of treated sewage impacts on the kelp community. Instead of release through dozens of diffusers in deep water a mile offshore of the kelp forest, the entire 187 million gallons per day production of the Point Loma sewage treatment plant was released through a point source within the kelp forest. The cloud of dirty water reduced the amount of light reaching the seafloor, a reduction that was strong enough to inhibit the germination of microscopic stages of giant kelp that we outplanted as bioassays. However, because of El Niño conditions the seawater was much warmer than normal, and thus it was highly unlikely that kelps would have germinated in the absence of the spill. Ironically, the sewage beneficially provided extra nitrogen to kelps stressed by warm, nutrient-depleted water; the Point Loma kelp canopy was markedly healthier than the La Jolla canopy, outside the range of the spill. No effects on animal populations were detected. At any rate, the negative effects were short lived, and by the end of the year, the only evidence of the spill was the greatly increased

ballast rock protecting the outfall. Compared with the natural disturbances we have documented, including kelp mortality from storms, sea urchin grazing, and El Niño events, the ecological impacts of the outfall break were trivial. This is strong evidence that effluent subject to pretreatment at the source followed by advanced primary treatment and diffused appropriately from a deep water outfall is not environmentally harmful. (Details are appended.)

Conclusion

In summary, I strongly support the recommendations of the NRC report. It defines concrete opportunities for building on the foundation established by the Clean Water Act to further improve marine water quality. It is responsive to changing societal needs and pollution problems, and to new developments in science and technology such as advanced primary treatment. For several years colleagues and I from Scripps Institution of Oceanography have been advocating many of these themes in public forums and in the EPA lawsuit. Specifically these are the importance of considering regional oceanography, the overprotective nature of the Clean Water Act in some regions, the lack of ecological importance of BOD in a deep water, open ocean environment such as San Diego's, the importance of considering all sources of problems, and the wise allocation of scarce public funds. Thus we are very pleased that this body of experts has conducted an in depth evaluation on a national scale, come to similar conclusions, and most importantly, provided an institutional framework for improving marine water quality in the 1990s. I strongly urge you to consider San Diego's open coastal, deep water environment and its proven ability to assimilate treated wastewater in the reauthorization of the Clean Water Act that is before you.

ADDITIONAL MATERIAL

1. What is the relevance of a broken sewage outfall to the Clean Water Act?
2. Other environmental impacts of the San Diego outfall
3. The NRC Report

WHAT IS THE RELEVANCE OF A BROKEN SEWAGE OUTFALL TO THE CLEAN WATER ACT?

Introduction

One phase of the EPA's ongoing suit against the City of San Diego over its failure to go to secondary sewage treatment focused on the health of the marine environment off Point Loma. The judge did not make a conclusive finding of environmental harm to the kelp forest caused by the outfall, but discussed what he considered to be suspicious erosion along the southern third of the forest.

The judge's concerns were based on history. The large kelp forests near San Diego and Los Angeles were decimated during the late 1950s, and the decline was associated with the discharge of poorly treated sewage, the 1957-59 El Niño, and an abundance of grazing sea urchins. In the case of the Palos Verdes kelp forest near the Los Angeles County discharge, the size of the kelp canopy was strongly negatively correlated with the annual mass emission rate of suspended solids from the outfall during both its decline and subsequent recovery. During the 1960s treatment was improved, outfalls were moved offshore to deeper water, and kelp forests recovered. By the early 1980s the technology for advanced primary treatment had improved to the point that there was no clear outfall effect on most kelp forests. Nevertheless, there remains concern about the kelp forest habitat which has become a focal point of efforts to enforce secondary treatment in San Diego.

Kelp forests are highly dynamic communities subject to many natural disturbances; during the last decade winter storms, the strong 1982-84 El Niño, and sea urchin grazing caused extensive mortality at Point Loma. The warm waters associated with El Niños exert their effects on kelps via reduced nutrients; temperature is inversely correlated with nitrate which is usually undetectable at temperatures above 16°C. Macrocystis pyrifera is a large kelp plant which has fronds that float on the sea surface; it provides most of the structure in this community and is the competitive

dominant plant. Successful germination and growth of young kelps depends upon proper temperature, light levels, and nutrients. Microscopic spores, gametophytes, and sporophytes are critical stages in the complex life history of kelps, and these tend to be more sensitive than larger plants. The effects of warm, nutrient-depleted waters on local kelp forests also range from some deterioration of the surface canopy most summers to significant mortality of established plants during strong El Niños. During the period of the spill, strong El Niño conditions were in effect as evidenced by anomalously high temperature and sea level

The Spill

The massive sewage spill during the outfall break in 1992 offered a chance to study a worst case scenario of treated sewage impacts on the kelp community. Instead of release through dozens of diffusers in deep water a mile offshore of the kelp bed, the entire 187 mgd production of the Point Loma sewage plant was released from a point source within the kelp forest for a two month period

The sewage plume was composed of relatively warm, fresh water with high sediment and coliform bacteria load. Strongly influenced by wind, the plume was highly dynamic; its buoyancy and momentum caused it to boil to the surface and undergo rapid mixing. The maximum salinity depression observed was about 9‰ on the surface at the edge of the boil; as the plume spread, its effects were confined to the upper 4 m. This minimal reduction in salinity was probably insufficient to affect the kelp fronds. Anoxic stress is associated with oxygen levels below 1ml/l; no values were observed below 5 ml/l compared with a background of about 6 ml/l of oxygen.

Ammonium, a major constituent of sewage, is a valuable substitute source of nitrogen for kelps during El Niño periods when natural waters are depleted of nitrate; however, the concentration of ammonium in undiluted sewage is toxic to kelps. In the immediate (to 300 m) vicinity of the spill some surface fronds of giant kelp showed signs of stress such as discoloration and deterioration, suggesting that they were harmed by high ammonium concentrations. However, concentrations quickly diluted to values beneficial to kelps throughout most of the kelp forest and as a result, the Point Loma kelp canopy was markedly healthier than the La Jolla kelp canopy, which was outside the range of the spill.

A grid of 12 stations with the outfall break in the center was established along the 12 and 18 m depth contours to study the impacts of

the spill on the benthic community--organisms associated with the bottom. Trays deployed on buoyed lines at each site were equipped with light meters, sediment tubes, and bioassays. Weekly data collected at each site showed a significant difference in light penetration between sites near and far from the break; the plume strongly reduced water transparency. There were no significant differences among sites after the break was repaired. Light meter data from three 12 m and four 18 m sites showed a similar pattern with a significant depression in mean daily irradiance at the site immediately south of the break at 12 m. Under normal oceanographic conditions, this depression would have been sufficient to inhibit kelp germination; however, because of warm El Niño temperatures, it is highly unlikely that germination would have taken place in the absence of a spill. These reduced light conditions also inhibited the growth of algal tissues under the sewage plume for the period of the spill.

Sedimentation was a concern because it may contain toxic materials and smother small organisms. Each tray had two sediment traps (40.6 x 3.8 cm PVC tubes) designed to trap sediment from the plume and from resuspension. Sedimentation rates near the break were significantly higher during the spill, but only by a factor of about three compared with the month following the repair, and much of the difference was due to storm waves causing resuspension during the spill. The City of San Diego's Wastewater Chemistry Laboratory analyzed sediments collected in the tubes for 39 chlorinated pesticides and polychlorinated biphenyls; all were below the level of detection. However, copper and zinc were present in levels above background. Pre-and post-repair particle size distributions showed that the median size increased from 23 to 70 μ with reduction of fine-grained sewage particles.

Bioassays of organisms likely to be sensitive to sewage effects were outplanted on the trays. To evaluate survival and growth of microscopic life history stages of *Macrocystis*, small ropes were inoculated with spores and outplanted on the trays along the 12 m depth contour. The first set, in the field for three weeks, showed a significant effect of the spill. Mean densities increased with distance from the break. Sporophyte growth showed a similar pattern increasing with distance from the outfall. But after six weeks in the field, a second collection 11 days after the repair was completed showed no significant differences in survivorship or growth despite the exposure to the same pre-repair conditions as the first sample. Thus there was an adverse affect in the vicinity of the break, but it appeared to be very modest and short-lived.

Potential toxic effects of trapped sediments on *Macrocystis* spores were also evaluated in the laboratory. Elutriates were prepared from sediments collected in the tubes and, as a control, from sediments collected in the unaffected La Jolla kelp forest. Spores were exposed to the elutriates using standardized procedures. There was no apparent effect of the break on the pattern of germination. However, germ tube elongation was significantly reduced in sediments collected nearest the break, suggesting some adverse impact. Again the effect disappeared when the test was repeated after the outfall was repaired.

As another bioassay, small (9-35 cm) *Macrocystis* sporophytes were also attached to the trays during the spill. It is difficult to determine the degree to which the observed general lack of growth resulted from low nutrients in the natural El Niño vs. spill impacts. It is ironic that the pipe repair coincided with an onset of upwelling. At any rate, the juvenile *Macrocystis* displayed no differences in survivorship or growth associated with proximity to the spill; after the repair all transplants began growing very quickly. Other outplanted species included the solitary cup coral *Paracyathus stearnsi*. Cup corals are suspension feeders, a feeding mode likely to be most sensitive to any potential toxic compounds associated with particles. There were no mortalities observed at any of the stations. In addition, at each of our study sites there are very high densities (patches > 100/m²) of all size classes of healthy *Balanophyllia elegans*, another small cup coral. Thus young recruits as well as adults apparently were unaffected by sedimentation associated with the break.

In nature young abalones live under rocks and ledges where they are potentially vulnerable to sedimentation. We outplanted 20mm *Haliotis rufescens*, eight animals per site. They were fed kelp when the trays were checked. After four months, only nine of the 96 abalones had died; of the nine, seven were at B1 where a *Macrocystis* holdfast had lodged in the tray and holdfast-associated predators such as octopus probably ate the abalones. The buoy marking the tray at D2, a site just south of the spill, was lost in March and the tray was not found until 13 May. All abalones were alive despite the spill, sedimentation associated with the repair, and two months of starvation.

Surveys during and after the spill searched for signs of stress to kelps and benthic animals. There was never any visible accumulation of sediments, even in pockets and crevices. With the exception of the area immediately under the large (30x90m) repair barge, the only visible damage to kelp plants was mechanical, resulting from winter storms and from the moorings of the repair barges. For 10-20 years we have monitored

five permanent sites, three across the depth gradient at the center of the forest and one at each end of the forest. *Macrocystis* populations along these transects undergo large fluctuations resulting from massive disturbance and strong recruitment events. Plants older than three years become increasingly vulnerable to mortality. All sites were mapped immediately before and after the spill. Even though most of the plants were four years old and many died in winter storms, the effect of the spill could not be seen in any of the density curves. One complication is that the southern edge of the kelp forest had been a sea urchin barren until 1991 when the urchins died; this resulted in strong kelp recruitment in late 1991. Under normal conditions we would have expected much more growth than was observed in April. Adult plants in this area and in the area immediately adjacent to the spill showed stress (drooping and deteriorating fronds) characteristic of reduced nutrient conditions seen during El Niños; however, the stress was probably compounded by reduced light during the spill. Indeed, except for the area immediately adjacent to the spill where the surface fronds showed signs of damage, the canopy at Point Loma was much healthier than that at La Jolla which deteriorated from the low nutrients associated with the El Niño. After the break was repaired we observed in many areas near the break very small kelp plants which must have germinated during or soon after the break. Certainly it is difficult to differentiate the effects of the spill from those of the El Niño, and there was rapid recovery of kelps with the onset of cold water in April. By the end of 1992, the area around the outfall break had developed a dense kelp forest and the only evidence of the spill was the greatly expanded ballast rock protecting the sewage pipe

Benthic animals most sensitive to sedimentation are suspension-feeding sponges, cup corals, gorgonians, bryozoans, hydroids, and tunicates, and detritus-feeding sea cucumbers, all of which appeared healthy and in normal abundance after the spill. Our assessment offers little information about very small individual animals, but certainly there is no indication of a negative impact on larger stages. Sea urchins, whose younger stages are thought by some to benefit from sewage solids, recruited in numbers typical of El Niño conditions. The City conducted bioassays with abalone larvae, presumably the most sensitive animal life history stage, and found no significant differences from controls at effluent concentrations of 1% or less for the period of the spill.

What does this experience say about the interpretation of the Clean Water Act requiring secondary treatment for oceanic outfalls? The language of the law refers to balanced indigenous populations, and communities comparable to reference communities and having the capacity

to recover. In this case kelp at the La Jolla reference site was more affected by the natural El Niño than the impacted community. Compared with the natural disturbances we have documented, including routine mortality from wave-induced entanglement, sea urchin grazing, El Niños, and the 200 year storm of 1988, the ecological effects of the pipe break were trivial. Furthermore, the recovery of the Point Loma kelp forest after each of the recent major disturbances was almost immediate ; in the case of the spill, the added nutrients actually ameliorated a natural El Niño.

With strong concern for the kelp forest, the federal government is pursuing a suit against San Diego to force a multibillion dollar secondary treatment facility. Given that it has been very difficult to find any effects of a massive spill in very shallow water in the middle of a major kelp forest, it seems that effluent subject to pretreatment at the source followed by advanced primary sewage treatment, and diffused appropriately in deep water as at Point Loma is much less environmentally damaging than is often supposed. Thus 60 m depth outfalls in open coastal areas with strong oceanic currents do not appear to require the additional secondary level of treatment.

OTHER ENVIRONMENTAL IMPACTS OF THE SAN DIEGO OUTFALL

Another issue under consideration is whether the bottom community in the vicinity of the existing outfall discharge is degraded. This is highly arguable because there are no anoxic sediments, essentially all the normal species are there at natural densities, there is no evidence of 'fin rot' or pollution indicators, or any other ecologically meaningful evidence that the benthos or water column are adversely affected. This issue usually is discussed by regulators in terms of whether there is a "balanced, indigenous population" which is defined to be an ecological community which exhibits characteristics similar to nearby healthy communities or may be expected to become re-established in the polluted habitat if the sources of pollution were removed. The recoverability issue is rarely considered and the decisions are based on whether there are significant differences in the densities of any species between the outfall and control areas. Since there are usually over 700 species, many populations would be expected to differ from those at a control site on the basis of chance alone. This is complicated at San Diego because the outfall is in a site of strong oceanic upwelling, and both control areas are oceanographically different from the outfall site. Also, the biological species alleged

to be effected are species that normally exist in a very patchy and dynamic pattern, usually correlated with upwelling regimes, such that in every case there are plausible alternative explanations for the observations. Finally, so far as the effluent is concerned, there is excellent scientific reason to expect a rapid recovery for most species should they be altered. At least some of the effects most likely result from the physical structure of the nine foot diameter outfall pipe which changes the currents along the bottom and attracts predators and thus these effects are completely independent of the discharge! In fact, the recent monitoring program at the Encina outfall in northern San Diego County which is the only comparable outfall to be monitored with both advanced primary and secondary treatment shows that there are no environmental changes when secondary treatment replaces advanced primary treatment.

A serious problem is that there is so much natural variation that even important changes are not easily defined. The EPA has struggled with this problem and in a 1990 report "Relative Risk Reduction Project" attempted to evaluate "ecological significance" as follows: A) The spatial extent of the area subjected to stress; B) The importance of the ecosystem actually affected; C) The potential of ecological effects and the ecological response; D) The intensity of exposure; and E) The temporal dimensions of both effects and ecological recovery. It is interesting to consider each in turn with regard to the San Diego outfall.

With regard to A, only about two square kilometers are alleged to be impacted; yet the bottom community along the 200 foot depth profile is probably the most widespread community in the world. Certainly the genera and almost all the species occur from shallow water to depths of about 250 feet along almost all of the world's continental shelves, covering millions of square kilometers. The genera even occur in polar habitats.

For B there are many ways to evaluate the relative importance of the ecosystem and assess the broader implications of the impact. For example, one might ask whether it is a critical habitat for threatened or endangered species? Does it have special ecological roles such as larval nursery grounds? Is it rare and endangered in its own right such as are wetlands and rocky intertidal habitats? Is it an area of special economic importance as a prime recreational or fishing area?. In every case the answer is clearly NO, not even close! The habitat in general does not objectively qualify in any

way, and certainly in no case can a credible argument be made that the small area has special ecological importance, even if it were ecologically altered (which it is not).

With regard to C, D, and E, the ecological effects of the dusting of organic matter are so trivial they practically defy measurement. And if the effluent (as opposed to the structure of the pipe) did have an effect, the recovery would be very fast. There are some data on the recoverability for an oceanographically very similar region north of San Diego in Orange County but one in which the benthic community was putrescent and radically altered. Gary Smith monitored the recovery after the pipe was extended and the treatment improved, and found that an almost azoic benthos was substantially recovered in just a few months. The mechanisms for such rapid recovery were described in the patch dynamic studies done by VanBlaricom who showed that these species respond to the structure of small depressions which trap flocculant organic material, much as would be expected near a sewer outfall.

Summarizing, considering the very fast recovery at the nearby Orange County outfall in the early 1970s and the lack of difference when Encina went to secondary and the fact that there are no ecologically significant effects at San Diego, it seems obvious that if there really is an impact of the effluent on the dynamic benthic community, the recovery will be extremely fast. The level of advanced primary treatment is completely adequate to protect the benthic community off San Diego.

A recent Ph.D. thesis by Alessandra Conversi showed no effects of the outfall on water clarity, an indicator of eutrophication, and it is extremely unlikely that there are any other adverse ecological effects. While there are no ecological effects nor probably any health effects, the coliform bacterial levels at the outer edge of the kelp forest are occasionally out of compliance with the California Ocean Plan, but this will be solved with the outfall extension currently under construction. Another water column issue is that of eutrophication resulting from nutrient loading from all sources, especially agricultural runoff. This can be an extremely serious problem in some regions, but it is not a problem in Southern California which has intense oceanographic mixing. Finally, secondary treatment does not remove much of the nitrogen anyway

The importance of the NRC's Integrated Coastal Management plan is that it recommends that limited public resources be applied to real ecological problems rather than squandering money on a non-problem. There are many urgent regional problems including a failing infrastructure, hundreds of storm drains which serve as pressure relief for raw sewage during rains as well as all types of non-point source pollutants such as toxic materials from the roads, yard runoff, etc. For physical reasons this material can be trapped in the surf zone where it really is a hazard to swimmers. In addition, San Diego has problems with raw sewage from Mexico which is transported in a coastal eddy to the mouth of San Diego Bay and the south end of the kelp forest.

There are also many serious environmental problems such as the loss of local wetlands which are legally-designated critical habitats for listed endangered species. In addition to the wetlands, habitat fragmentation and abuse have almost destroyed the coastal sage scrub community as well as the rocky intertidal community. The inability to manage our fishery resources is a national shame and the local coastal communities lack in a functional sense almost all the large and medium sized predators such as Broomtail Grouper, Black and White Sea Bass, Halibut, Soupin and Blue Sharks, most of the large rays which used to be abundant, and the large ecologically important individuals of Sheephead, Cabezon, Lobsters, Kelp and Sand Bass, red sea urchins, etc. Like the terribly fragmented coastal sage scrub in which the fragments are too small to support the native animals, the kelp forest is over-fished to the point of being a ghost community defined by the plants but lacking any semblance of its natural animal community.

NRC REPORT

I was one of many people who contributed input to the report of the National Research Council, Managing Wastewater in Coastal Urban Areas, released April 16, 1993. I followed the progress of this three year study and strongly support its recommended changes to the Clean Water Act in response to changing societal needs and pollution problems, and to some two decades of improvements in science and technology. The report stressed the importance of spending scarce public resources on first, the appropriate level of sewage treatment for regional oceanographic and geographic conditions, and two, the most urgent problems facing regional marine environments.

The Clean Water Act of 1972 made major contributions to the health of our nation's waters, particularly to rivers and lakes, with its mandate of secondary sewage treatment. However, improved scientific understanding indicates that standards established in the CWA for the protection of all waters are overly protective for some discharge environments, yet do not provide adequate protection from some types of problems in other environments. Because of wide variation in the physical, chemical, and biological nature of receiving water bodies, and in geography and bathymetry, the NRC report found that it is simply not possible to prescribe a particular technology or approach that will address all water quality issues at all locations in a satisfactory manner. An example particularly pertinent to San Diego is the issue of BOD, or biochemical oxygen demand. BOD is a serious problem in freshwater environments, some estuaries or other shallow marine discharge sites, but BOD from wastewater flows is not ecologically important in open ocean, deep water discharge sites such as off the coast of San Diego. On the other hand, the NRC report gave highest priority to problems with excess nutrients suffered by many estuaries of the Atlantic and Gulf coasts. Secondary treatment does not remove significant amounts of nitrogen from wastewater, and enrichment of this nutrient can cause oxygen depletion, reduced fish and shellfish populations, nuisance algal blooms, and dieback of seagrasses and corals. The NRC report notes that excess nutrient enrichment or eutrophication is not known to be a problem along much of the open Pacific coast, but is a persistent problem in many estuaries, bays, and semi-enclosed waterbodies along the Atlantic and Gulf coasts.

The NRC report recommends that recent scientific and technological advances should be recognized by the law. For example, chemically enhanced primary treatment is an effective means of removing suspended solids and associated contaminants where BOD is not an issue. Coastal wastewater management should be adapted to the characteristics and uses of the receiving environment based on a determination of what combination of control measures can effectively achieve water and sediment quality objectives. Such an environmentally based approach would find that the existing technological standard results in overcontrol in some places and thus poor return on public funds, and inadequate protection of environmental health in other regions.

A major finding of the NRC report is that as improvements have been made in the quality of point source discharges, the impacts of other sources of pollution, which can be diffuse or point sources, have become much more apparent. It makes no sense, either scientifically or fiscally, to focus our resources on further refinements of easily regulated point sources, if other

sources of pollutants are more serious problems. In San Diego, we have frequent problems with water quality in Mission Bay and shallow nearshore waters important to swimmers and surfers in this water-oriented culture of residents and visitors--problems which will not be solved with secondary sewage treatment at Point Loma. To alleviate these problems, more resources need to be devoted to urban runoff, the flushing of coastal lagoons, the aging infrastructure which conveys sewage to treatment plants but often leaks, and the continuing saga of Tijuana sewage. Integrated Coastal Management, as proposed by the NRC, offers a framework for coastal regions to establish objectives and set priorities for protecting coastal resources. Integrated Coastal Management should provide the opportunity to consider regional differences, multiple sources of perturbations, costs and benefits in the development of management strategies. The flexibility offered by Integrated Coastal Management would increase the scientific basis and the efficiency of public fund expenditures, as well as the environmental effectiveness of policies and practices for wastewater management.

In summary, I strongly support the recommendations of the NRC study. I believe that it defines concrete opportunities for building on the foundation established by the Clean Water Act to further improve marine water quality. I especially appreciate its responsiveness to changing societal needs and pollution problems, and to new developments in science and technology. For several years colleagues and I from Scripps Institution of Oceanography have been advocating many of these themes in public forums and in the EPA lawsuit. Specifically these are the importance of considering regional oceanography, the overprotective nature of the Clean Water Act in some regions, the lack of ecological importance of BOD in a deep water, open ocean environment such as San Diego's, the importance of considering all sources of problems, and the wise allocation of scarce public funds. Thus we are very pleased that this body of experts has conducted an in depth evaluation on a national scale, come to similar conclusions, and most importantly, provided a framework for improving marine water quality in the 1990s. I strongly urge you to consider the NRC's recommendations in the upcoming reauthorization of the Clean Water Act.

U.S. HOUSE OF REPRESENTATIVES

Committee on Merchant Marine and Fisheries

July 8, 1993

My name is John J. Boland and I am a Professor at the Johns Hopkins University in Baltimore, Maryland, specializing in environmental economics and policy. I served as chair of a committee of the Water Science and Technology Board of the National Research Council (NRC) that studied ways to more efficiently and effectively manage wastewater in the coastal regions of the U.S. The committee's report, *Managing Wastewater in Coastal Urban Areas*, has recently been released.

With me today is William Eichbaum, an environmental attorney and public policy expert, who is currently with the World Wildlife Fund (WWF). Prior to joining WWF, Mr. Eichbaum managed environmental programs in the Commonwealth of Massachusetts and the State of Maryland. Mr. Eichbaum also served on the NRC committee. We are here, at Chairman Studds' invitation, to present some of the findings and recommendations contained in the NRC report.

More than a third of all Americans live along a coast, usually in urban areas. Every day, more than 1,400 wastewater treatment plants in U.S. coastal cities discharge 10 billion gallons of treated effluent in estuaries, bays, sounds, and marine waters. Another 11.3 billion gallons of treated industrial wastewater and spent cooling water is discharged in the same regions.

In addition, non-point sources of pollution, including urban and agricultural runoff, are a growing problem. Pollution can also come from outside the coastal region—from towns, farms, and factories adjacent to streams and rivers flowing to the coast. There are other human activities that can affect coastal marine systems. For example, increased irrigation by farmers can reduce the amount of freshwater flowing into estuaries and increased fishing activities can alter the ecological balance in marine waters.

Current wastewater management policy in the U.S. dates from passage of first version of the Clean Water Act in 1972. That policy is command-and-control in nature. It relies on technology-based effluent standards implemented through a national permit system, supplemented by various other measures including (for many years) subsidies for treatment plant construction.

The nation's financial commitment has been large, with more than \$76 billion spent on building municipal treatment plants alone. Operating costs are on the order of several billion dollars per year. Some results have been impressive, with relatively rapid water quality improvement in many places, especially in freshwater lakes and rivers. But problems remain throughout the nation.

Of particular interest to our committee are the densely settled urban coastal regions. Here, wastewater inputs, combined with the impacts of other human activities, are causing much stress to marine ecosystems. Despite considerable effort, coastal water quality conditions are remaining about the same, or getting worse in some places. This suggests that existing policy leads to undercontrol.

Paradoxically, however, some of the best-publicized concerns about wastewater management policy in coastal areas refer to allegations of overcontrol (Boston, San Diego). It has been argued that costly treatment processes now required in these cities will not produce significant improvements in water quality.

After reviewing these and other issues, the NRC committee made a number of specific findings and recommendations.

Regional Differences Because of wide variations in coastal systems, wastewater and stormwater management strategies should be tailored to the characteristics, values, and uses of each receiving environment.

Nutrients in Coastal Waters Nutrient enrichment, primarily due to excess nitrogen, is an important problem in many estuarine and some coastal marine systems. Greater attention should be focused on preventing harmful levels of nitrogen and other nutrients.

Source Control and Water Conservation Reduction or elimination of pollutants at their sources is an effective tool for managing both point and diffuse sources. Source control should be strongly encouraged through both incentives and regulation.

Levels of Treatment Important water and sediment quality problems in the coastal zone often differ from those associated with inland waters. Implementation of an environmental quality-based approach in coastal areas would require levels of treatment that, depending on regional needs and receiving water characteristics, will often be different, higher or lower, than current requirements.

Stormwater and Combined Sewer Overflows Urban runoff and combined sewer overflows are major contributors to water quality problems in coastal urban areas. Abatement requirements should be based to the greatest extent possible on an understanding of regional and local hydrology and coastal oceanography.

Detecting Human Pathogens Although concentrations of coliform bacteria higher than conventional standards indicate unacceptably high risk of exposure to human pathogens, the

opposite is not true--concentrations of coliform bacteria below the standards do not reliably predict safety. Responsible agencies should vigorously pursue the development and implementation of techniques appropriate for routine monitoring of pathogens, especially in marine and estuarine waters.

Evaluation and Feedback Management systems should be flexible so that they may be changed as needed to respond to new information about environmental quality and the performance of existing systems.

The key finding of the Committee, however, refers to the way in which wastewater management should be conducted in the future. The Committee finds that the fragmented, end-of-pipe-oriented, technology-based approach of the Clean Water Act is no longer appropriate to the water quality needs of the coastal regions. Instead, wastewater and stormwater management strategies should be developed in the context of each other and other important sources of perturbation in the coastal zone. Successful management strategies must take into account multiple sources of stress and identify strategies for controlling inputs in the most cost-effective manner.

Current policy regulates each type of source separately and relies heavily, though not exclusively, on end-of-pipe treatment. However, there may be cases where it is more effective and/or efficient to control diffuse or other sources rather than upgrading treatment of point sources. Increased efforts at pollution prevention may be preferable to further increments of treatment at municipal plants. Land use controls may reduce the need for costly stormwater management systems. Economic incentives may function better than technology standards in some situations. However desirable such solutions may seem, they are largely beyond the reach of existing wastewater policy. This leads to the Committee's final recommendation.

Integrated Coastal Management (ICM) Wastewater and stormwater management and other protection strategies for coastal urban areas should be developed and implemented within a system of ICM.

ICM is an ecologically based, iterative process for identifying and implementing, at the regional scale, environmental objectives and cost-effective strategies for achieving them. It identifies environmental and human resources that require protection, considers the multitude of factors that may contribute to adverse impacts, and weighs the relative importance of various impacts and contributors. ICM is flexible, so that problems can be addressed at a variety of levels of integration depending on their complexity, and priorities can be set in an explicit manner. As proposed here, ICM has two fundamental objectives: 1) to restore and maintain the ecological integrity of coastal ecosystems, and 2) to maintain important human values and uses associated with those areas.

The report contains much information about the elements and features of the ICM

process. I will make only a few observations here. One is that ICM is necessarily integrated across agencies and jurisdictions. Since it deals with all sources of stress on the coastal environment, the plan must be formulated, approved, and implemented with the full participation of each agency with a related management or regulatory function.

Similarly, ICM is integrated across management strategies and regulatory instruments. Every approach should be considered: command and control regulation, economic incentives, public education, land use planning and controls, direct public investment, voluntary actions. The ICM plan includes those measures judged best in each situation.

Finally, ICM, as described in this report, is a creature of local initiative. The Committee believes that, because of the necessary diversity of participants and approaches, ICM cannot be imposed from above. It is a process that is voluntarily entered into at the local or regional level in order to achieve the benefits of effective wastewater management in a flexible, cost-effective way. The role of the federal government, in this scenario, is to provide the opportunity and the incentive for ICM, while ensuring that minimum acceptable performance is achieved. The Committee is convinced that many coastal communities are ready and able to choose ICM, if the option is presented to them. Over time, most, if not all, coastal communities or regions may be motivated to adopt this strategy.

In the next twenty years, it should be the nation's goal to implement a system of integrated coastal management for all of the country's urban shores. Full integration should include all sources of stress to the coastal environment. It should address all environmental media, looking at tradeoffs between disposal of waste to the land, water, and air. It should incorporate the principles of pollution prevention and source control and be a flexible process that facilitates progress and adapts to new information without prescribing the technological means for meeting specified goals.

ICM should be based in regional objectives and goals for the coastal zone and involve a partnership between federal, state, and local institutions. The lessons learned from the past twenty years of progress clearly point to ICM as the best direction for the future.

STATEMENT OF JAMES O. MCDONALD
TO THE
SUBCOMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES
OF THE
COMMITTEE ON MERCHANT MARINE AND FISHERIES
U. S. HOUSE OF REPRESENTATIVES

JULY 8, 1993
SAN DIEGO, CALIFORNIA

MY NAME IS JAMES O. MCDONALD. I AM A RESIDENT OF THE CITY OF SAN DIEGO, CALIFORNIA.

BEFORE MOVING TO SAN DIEGO, I SERVED FOR EIGHT YEARS AS THE DIRECTOR OF ENFORCEMENT OF REGION 5 OF THE U. S. ENVIRONMENTAL PROTECTION AGENCY WITH HEADQUARTERS IN CHICAGO, ILLINOIS.

AS SUCH, IT WAS MY JOB TO SUPERVISE THE ENFORCEMENT OF FEDERAL POLLUTION CONTROL LAWS WITHIN THE SIX-STATE REGION COMPRISED OF ILLINOIS, OHIO, INDIANA, MICHIGAN, WISCONSIN, AND MINNESOTA, ALL OF WHICH BORDERED ON THE GREAT LAKES.

PRIOR TO BEING THE ENFORCEMENT DIRECTOR, I SERVED AS HEAD OF THE MIDWEST FEDERAL SEWAGE TREATMENT WORKS CONSTRUCTION GRANTS PROGRAM, AMONG OTHER POSITIONS IN THE FEDERAL POLLUTION CONTROL FIELD FOR A NUMBER OF YEARS.

I COME BEFORE YOU TODAY, THOUGH, NOT AS A SPEAKER FOR THE ENVIRONMENTAL PROTECTION AGENCY OR ANY OTHER PUBLIC OR PRIVATE GROUP, BUT AS A CITIZEN INTERESTED IN ENHANCING AND PROTECTING THE WATER QUALITY AFFECTED BY THE POLLUTION DISCHARGES FOR WHICH THE CITY OF SAN DIEGO IS RESPONSIBLE.

IN A NUTSHELL, I BELIEVE IT'S FINALLY TIME TO CALL A SPADE A SPADE IN SAN DIEGO'S SEEMINGLY ETERNAL QUEST TO GET AROUND ITS RESPONSIBILITY TO MEET THE SECONDARY TREATMENT REQUIREMENTS OF

THE CLEAN WATER ACT--AS THOUSANDS OF OTHER MUNICIPALITIES HAVE ALREADY DONE. EQUITY IS EQUITY. ENOUGH IS ENOUGH.

SAN DIEGO BILLS ITSELF AS AMERICA'S FINEST CITY. IT CERTAINLY IS ONE OF THE VERY FINEST--IF NOT THE FINEST--CITY IN SQUIRMING, WIGGLING, PROCRASTINATING, MAKING ENDLESS EXCUSES, AND, YES, IN EXHIBITING OUTRIGHT DEFIANCE IN COMING TO TERMS WITH THE FEDERAL MUNICIPAL TREATMENT LAW, A LAW THAT HAS BEEN THE LAW OF THE LAND FOR ALMOST 21 YEARS.

IN A WORD, IN MY EXPERIENCE AS A FEDERAL ENFORCER, SAN DIEGO'S CONDUCT HAS BEEN OUTRAGEOUS.

THE CITY OF SAN DIEGO HAS BEEN DELINQUENT FOR FAR, FAR TOO LONG IN MEETING ITS RESPONSIBILITIES TO UPGRADE ITS TREATMENT SYSTEM.

IF AS MUCH DEDICATION HAD BEEN SPENT BY THE CITY IN MEETING ITS RESPONSIBILITIES UNDER THE LAW, AS HAS BEEN SPENT IN DUCKING THOSE LEGAL RESPONSIBILITIES, AN UPGRADED AND EXPANDED SEWAGE TREATMENT SYSTEM WOULD HAVE BEEN IN PLACE YEARS AGO AT A SAVINGS OF MANY DOLLARS. INSTEAD, THE CITY CONSTANTLY HAND-WRINGS ABOUT THE CURRENT COST OF UPGRADING.

THE CITY'S HISTORY OF FOOT-DRAGGING AND SHEER FLAUNTING OF THE LAW, IN THE FACE OF AN INADEQUATE SYSTEM, HAS BEEN THE HEIGHT OF CIVIC IRRESPONSIBILITY.

NOR IS THE CITY ALONE IN FAILING TO MEET ITS LEGAL RESPONSIBILITIES. THE STATE AND FEDERAL REGULATORY AGENCIES, INCLUDING THE U. S. DEPARTMENT OF JUSTICE, MUST SHARE THE BLAME.

THE SITUATION BEFORE YOU TODAY COULD LIKELY HAVE BEEN

SETTLED YEARS AGO IF THESE STATE AND FEDERAL AGENCIES HAD BEEN SUFFICIENTLY DILIGENT AND PERSISTENT IN ENFORCING THE LAW IN ONE OF THE NATION'S MAJOR CITIES. WITH MANY YEARS OF LAX REGULATORY ACTION, SMALL WONDER THAT THE CITY OF SAN DIEGO THOUGHT IT COULD GET AWAY WITH WHAT IT HAS GOTTEN AWAY WITH.

AS FAR AS SEWAGE TREATMENT IS CONCERNED, SAN DIEGO SEEMS TO BE IN A TIME WARP. WHEN I STARTED IN THE WATER POLLUTION CONTROL FIELD, THERE WAS A POPULAR SAYING AMONG POLLUTERS THAT THE "SOLUTION TO POLLUTION IS DILUTION;" THAT IS, THAT AS MUCH POLLUTION AS POSSIBLE SHOULD BE DISCHARGED INTO RECEIVING WATERS WITH AS LITTLE TREATMENT AS POSSIBLE.

UNFORTUNATELY, THAT VIEW STILL PREVAILS IN SOME QUARTERS, INCLUDING SOME SCIENTIFIC QUARTERS, EVEN THOUGH WE HAVE LONG SEEN THE CONSEQUENCES OF SUCH SHORT-SIGHTEDNESS. AS AN EXAMPLE, SAN DIEGO THINKS THAT BY MOVING ITS OUTFALL FURTHER INTO THE OCEAN IT CAN SOLVE A PART OF ITS POLLUTION PROBLEMS.

THE SOLUTION TO POLLUTION IS NOT ENDLESS DILUTION. INSTEAD OF PUTTING IN AS MUCH POLLUTION AS POSSIBLE IN RECEIVING WATERS, THE AIM SHOULD BE TO KEEP OUT AS MUCH AS POSSIBLE. WILL SOME NEVER ADMIT TO THAT SIMPLE PRINCIPLE?

FINALLY, THE QUESTION OF EQUITY IS OF EXTREME, IF NOT PARAMOUNT, IMPORTANCE IN DECIDING THE FATE OF SAN DIEGO'S PLEA FOR A RELAXED TREATMENT STANDARD. HOW EQUITABLE WOULD GRANTING SUCH FAVORITISM BE TO THE MUNICIPALITIES THAT HAVE GONE FORWARD TO MEET THE EXISTING LAW? CERTAINLY IT WOULD NOT BE EQUITABLE. IF A LAW ISN'T FAIR, WHAT GOOD IS THE LAW?

GRANTING RELIEF TO SAN DIEGO WOULD ADDITIONALLY SEND A STRONG MESSAGE THAT, IF A POLLUTER IS ABLE TO RESIST THE LAW LONG ENOUGH, AS SAN DIEGO HAS DONE WHILE THE MAJORITY OF MUNICIPALITIES HAVE GONE FORWARD, THEN IT IS IN A POLLUTER'S BEST INTEREST TO DO THE SAME AMOUNT OF FOOT-DRAGGING.

NO AMOUNT OF SCIENTIFIC CLAIMS OR FINANCIAL HARDSHIP CLAIMS CAN REFUTE THAT CLEAR FACT.

IN CLOSING, I URGE YOU TO MAINTAIN THE LAW'S INTEGRITY IN REJECTING SAN DIEGO'S APPEAL FOR FAVORITISM IN AMENDING THE LAW.

VARIABILITY OF WATER COLUMN TRANSPARENCY, VOLUME FLOW AND SUSPENDED SOLIDS NEAR SAN DIEGO SEWAGE OUTFALL (CALIFORNIA): 15 YEARS OF DATA

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The spatial and temporal variability of transparency measured for 15 years at 7 stations near the San Diego sewage outfall has been investigated and compared to the temporal variability of sewage suspended solid discharge and flow rate. The purpose of the time-series analyses was to distinguish natural from human (sewage discharge) causes of temporal changes in transparency. The results show that: 1) variations in transparency are highly correlated over the entire area, but there is a gradient in means and variability in the direction perpendicular to the coast; 2) there are no long term trends for increase or decrease in the water clarity at any of the stations; 3) most of the variance of transparency is contained in the seasonal frequency band; 4) over the same time period sewage discharge has significantly increased and suspended solids decreased; 5) most of the variance of these human-caused properties is in the interannual frequency band; (6) there is no correlation at any time-lag between water clarity and suspended solid discharge or flow. These results lead to the conclusion that these anthropogenic properties are not affecting transparency, while natural factors such as seasonality and distance from coast do.

KEY WORDS: Sewage, suspended solids, transparency, coastal discharge, time-series

INTRODUCTION

As in all southern California, the population of San Diego has greatly increased in the last 20 years (by 75% in the period 1970–88, U.S. Bureau of the Census, 1990). The human impact on coastal waters has increased at the same time. For example, the sewage discharge (see Figure 1) in the period 1975–87 increased by 68%, from 413 to 693 million litres per day (Shafer, 1976; SCCWRP, 1987). One question which easily arises is whether this discharge is affecting the quality and ecology of near-coastal waters[†]. Several studies in the Southern California Bight have concluded that there are deleterious effects of sewage outfall discharges on benthic communities (Smith, 1974; Bascom, 1978; Bascom *et al.*, 1978; Reish *et al.*, 1980; Dhargalkar, 1986), but there is less conclusive evidence of impact on the water column (Thomas, 1972; Eppley, *et al.*, 1972; SCCWRP, 1973; Beers, *et al.*, 1979). This, however, is a part of the ocean where primary production takes place, and through which light must penetrate to permit recruitment of kelp and other benthic algae. One of the purposes of this paper is to evaluate the effects of the input of sewage on the water column transparency.

One crucial problem in the assessment of the human impact on the environment

[†]In fact, this has recently been the focus of a federal lawsuit which concluded by requiring San Diego to adopt secondary treatment of sewage.

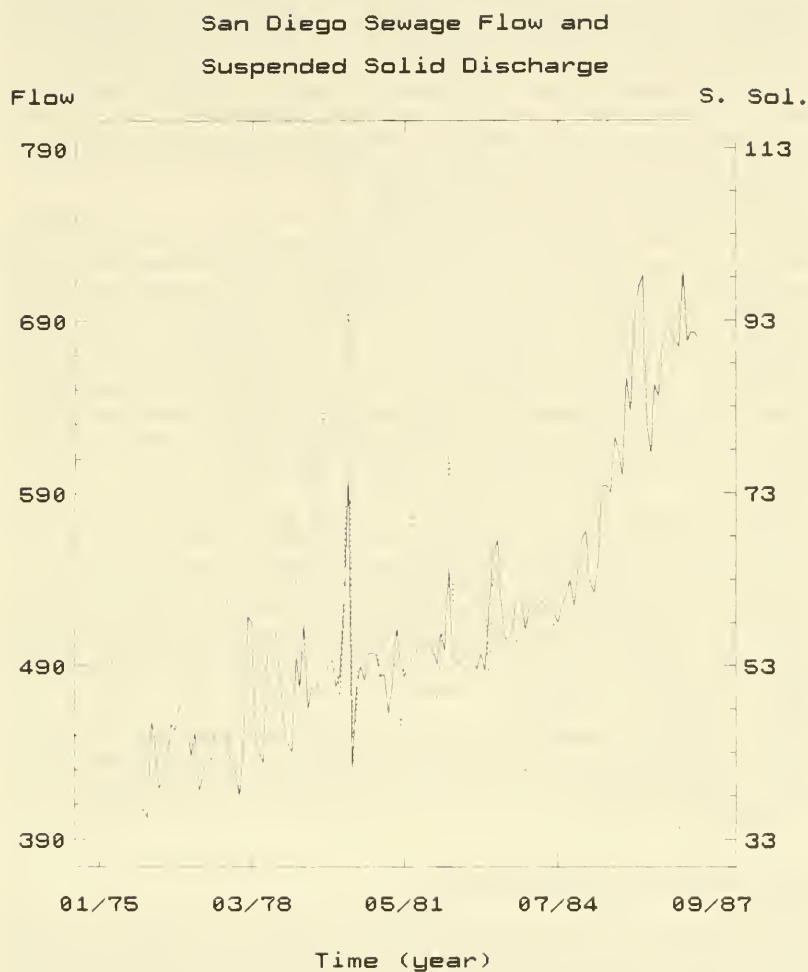


Figure 1 San Diego sewage flow (—) in 10^6 litres/day and suspended solid discharge (. . .) in tonnes/day, for the period 1975–87. Lines are plotted from monthly averages of daily data. The flow percentage change between 1975 and 1987 is +68%, the suspended solids is –54%.

is to scale it against the background of natural variability. This distinction is becoming of increasing importance in an age in which man has reached the technological ability of making permanent changes to the surrounding environment. For example, although rises in both global air temperature and atmospheric CO_2 have been substantiated, there is still debate on whether the first is caused by the latter, as a consequence of human fuel consumption, or whether it is part of a large natural fluctuation (Kuo, *et al.*, 1990). The best tool to put environmental changes in the right perspective is to have long time-series of data which can show the baseline on which humans superimpose their activity.

In this article we try to approach the problem of the influence of sewage discharge on the water column from this point of view. To this purpose, we utilized 15 years (1972–87) of water quality data collected by the Point Loma Treatment Plant (the sewer discharge for the city of San Diego) during its federally mandated monitoring plan. Two control and five test stations (see "Data, Methods and Analyses" and Figure 2) were sampled monthly for water quality parameters (temperature, transparency, transmissivity, dissolved oxygen), while suspended solid discharges and flow rate were measured daily since 1975 in the treatment plant. We utilized part of this data-set (transparency, flow and suspended solids) to investigate: a) the patterns of spatial and temporal variability of transparency at test and control stations; b) whether suspended solid discharge (or sewage flow) had affected water transparency.

Suspended solids exist naturally in all waters and consist of sand, clays, phytoplankton, zooplankton, bacteria, etc. Oceanic concentrations vary from $< 0.1 \text{ mg l}^{-1}$ in open ocean to many g l^{-1} in estuaries and nearshore waters (Jerlov, *et al.*, 1972; Jerlov, 1976). In the sewage effluent of Point Loma, suspended solids, composed of sewage solids, organic matter, bacteria, etc., are of the order of 80 mg l^{-1} after advanced primary treatment, and this concentration becomes diluted to about 1:200 (Thomas, 1972) at the diffuser ports at the end of the outfall. Suspended solids in the water diminish its transparency because of light absorption and scattering (Jerlov, *et al.*, 1972).

The pattern of variations in water quality off Point Loma is more than of abstract interest. There has been extensive debate on whether the reduction in size of the kelp beds in the area was due to a decrease in available light caused by suspended solid discharge from the outfall.

DATA, METHODS AND ANALYSES

The Point Loma Treatment Plant (San Diego City, California) became operational in 1963. It used primary treatment until July 1985, when it started advanced primary treatment, which achieved at least 75% removal of suspended solids. The treated effluent is discharged approximately 3.5 km off-shore Point Loma, at a depth of about 62 m, through two multiport diffusers 415 m long (City of San Diego, 1988).

Water transparency, suspended solid discharge and flow data were obtained from the federally mandated monitoring program at the Point Loma Treatment Plant. The monitoring plan started in the 1960s, but the data made available to us started in 1972. All the data handled, whether key-entered by the authors or by the treatment plant personnel, have been checked for errors against the plant log books.

Water column transparency was measured monthly at 5 test stations 1.8 to 3.5 km from the sewage outfall and at 2 control stations about 9 km north and south of it (see Figure 2). The 15 year sampling period used in this research, from July 1972 to June

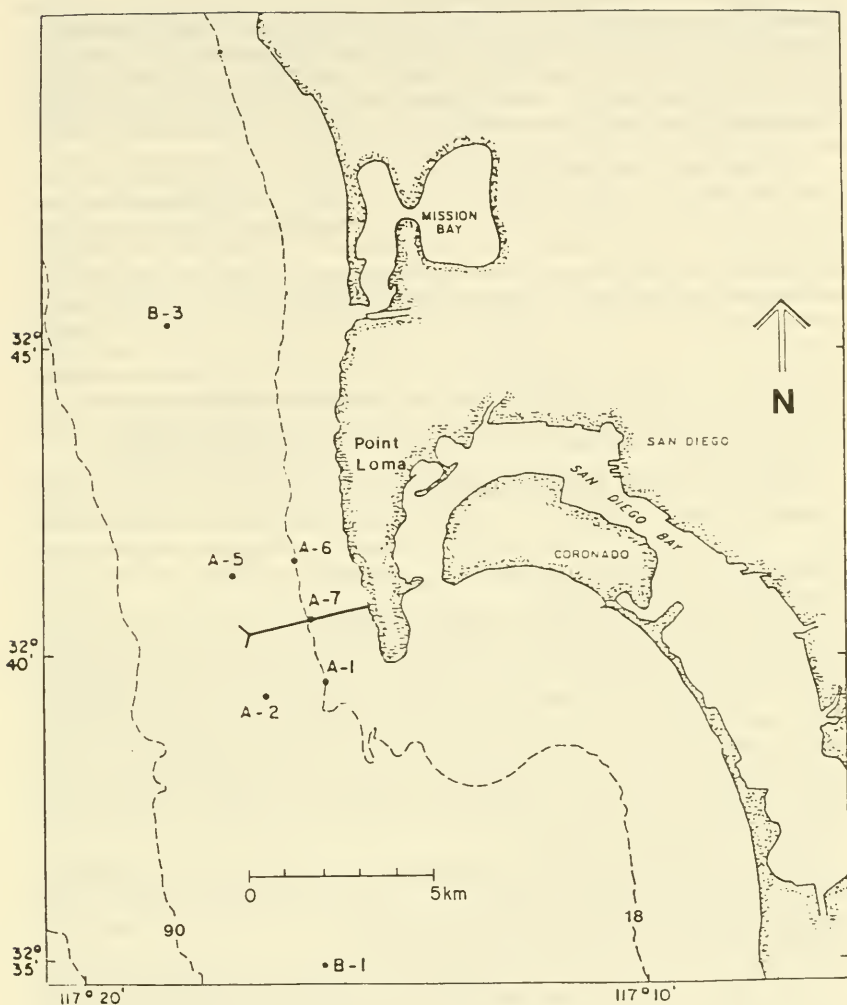


Figure 2 The seven sampling stations around San Diego City sewer outfall. Stations A are "test" stations, stations B are controls. The "y" between stations A2 and A5 represents the end of the outfall. The depth contours are indicated in metres.

1987, resulted in time-series with 180 data points for each of the 7 stations. The sampling device used was a white Secchi disc with a diameter of 30 cm. Transparency (m) was defined as the depth in metres at which the disc disappeared. The 7 sampling stations were located along isopleths of depth: the three most in-shore stations were at or about 1.8 km from the coast and along the 18 m contour. The four off-shore stations, which include the two controls, were at the same contour as the end of the sewage outfall, around 60 m.

The reliability of the Secchi disc measurement has been long questioned: it is affected by the light conditions (time of the day, weather, relative ship position), and there is uncertainty in relating it to the attenuation coefficient (Graham, 1966; Tyler, 1968; Williams, 1968; Holmes, 1970; Preisendorfer, 1986; Megard and Berman, 1989). However, Megard and Berman, after comparing Secchi transparency with underwater irradiance, state "the information obtained at sea with a Secchi disc is as accurate and precise as that obtained under these conditions with a photoelectric sensor". Further, it has the advantages of being easy to use, which reduces the operator error; relatively inexpensive; widely used in oceanography; and directly related to the euphotic depth (1% light level), and therefore to the area where most of the primary production takes place (three times Secchi depth is often equivalent to the 1% light level; calculations derived from Megard and Berman 1989).

Suspended solids and sewage flow have been measured daily at the treatment plant since January 1975, for a total of 4199 data points each. Suspended solids (mg l^{-1}) are defined as the residue retained on a standard glass fibre filter which is dried at 103–105 °C after filtration. For the analyses performed in this paper we have utilized suspended solid discharge (tonnes/day), i.e. the suspended solids times the sewage flow discharged (10^6 litres/day).

For the analysis of the spatial variability of transparency we compared the seven (control and test) time-series. For the time-series analyses we used both the individual seven time-series and their spatial average. Since the spatial analyses showed no significant differences between test and control stations (see "Results and Discussion"), the spatial average of the seven transparency time-series was used for the comparisons between transparency and flow or suspended solids. To make the series comparable, the average transparency was reduced 2.5 years in order to start together with the flow and suspended solids series (January 1975), while the daily values of flow and suspended solids were averaged over 30 days to derive monthly values ($n=150$ for both series).

In order to identify any relationship between transparency and sewage discharge, we analyzed the data using conventional statistics and time-series analyses. The procedures used included one-way analysis of variance, correlations, linear trend analyses, spectral analyses and cross-correlations.

To test for spatial variability of transparency we used one way analysis of variance over the whole grid. The data of each station was tested for normality (D'Agostino D test, $\alpha = 0.05$), and in each case, the Null Hypothesis that samples belonged to a normal distribution could not be rejected. The correlation coefficients between the seven sampling stations were calculated using the Pearson product moment correlation. Linear trend analysis, by least squares fit, i.e. fitting the variable analyzed to time and minimizing the sum of squares of the residuals of the fitted line, has been used to evaluate long term temporal changes. Spectral analysis was used to identify frequencies of highest variability. After the series were detrended, tapered, and the means removed, the spectral frequencies were calculated with the Fast

Fourier Transform. The daily series were band-averaged over 4 bands giving 8 degrees of freedom; the monthly series were not averaged. In the following discussion the terms "seasonal" and "annual" will be used interchangeably to denote changes on a 12 month period. To observe lag period of highest correlation and possible lead/lag relations between variables we used the cross correlation analysis which estimates the correlation between one time-series at time t and a second series at time $t+k$ as a function of the lag, or time differential k .

RESULTS AND DISCUSSION

Plots of individual Secchi depths versus time for each sampling station are given in Figure 3. Even before statistical analyses are done it is possible to note a few points:

- a) transparency is highly variable in time at all stations.
- b) there are no visible trends in any of the water clarity time-series.
- c) the in-shore stations (the three in the right column in Figure 3) are generally less transparent (lower means).
- d) the in-shore stations in general have also smaller fluctuations (lower variance).
- e) the control stations (B) are not obviously different from the off-shore test stations (A2, A5).

First, we investigated the spatial characteristics of transparency, to answer the following questions: Is the inshore-offshore difference in the magnitude of transparency, shown in Figure 3, significant? Is there a gradient between in-shore and off-shore stations rather than between control or test stations? In spite of the differences in means, is transparency correlated between stations within the entire area? And, if so, are the transparency fluctuations synchronous or lagged?

The first question was tested with a one-way analysis of variance on the seven time series. The null hypothesis that the seven population means were equal was rejected at the 0.05 level ($0.002 < p < 0.005$). The individual means and 95% confidence intervals show that the stations can be subdivided in 3 groups (see Figure 4a). These groupings seem to be driven by the distance from the coast rather than the distance from the outfall: in fact, group 2 stations span a distance of 9 km in the direction parallel to the coast (1.8 to 7 km from the outfall), but have much clearer water than the stations of group 3, which are just 1.8 to 2.5 km from the sewer outfall, in the direction toward the coast. Although the southern control shows waters clearer than any other station, the northern control is indistinguishable from the off-shore test stations (group 2). This indicates the importance of both the control locations with respect to the sewer and of having more than one control.

Although the means are different, transparency does fluctuate synchronously in the entire area: multiple cross-correlation of the seven transformed time series indicated that the maximum correlation was always at lag 0. The Pearson's correlations show that all time-series are highly correlated at $\alpha = 0.05$ (Figure 4b).

The spatial analyses reveal that transparency variations are highly correlated over the entire area, but that there is a magnitude gradient perpendicular to the coastline. Test and control stations at the same distance from coast do not differ

Transparency

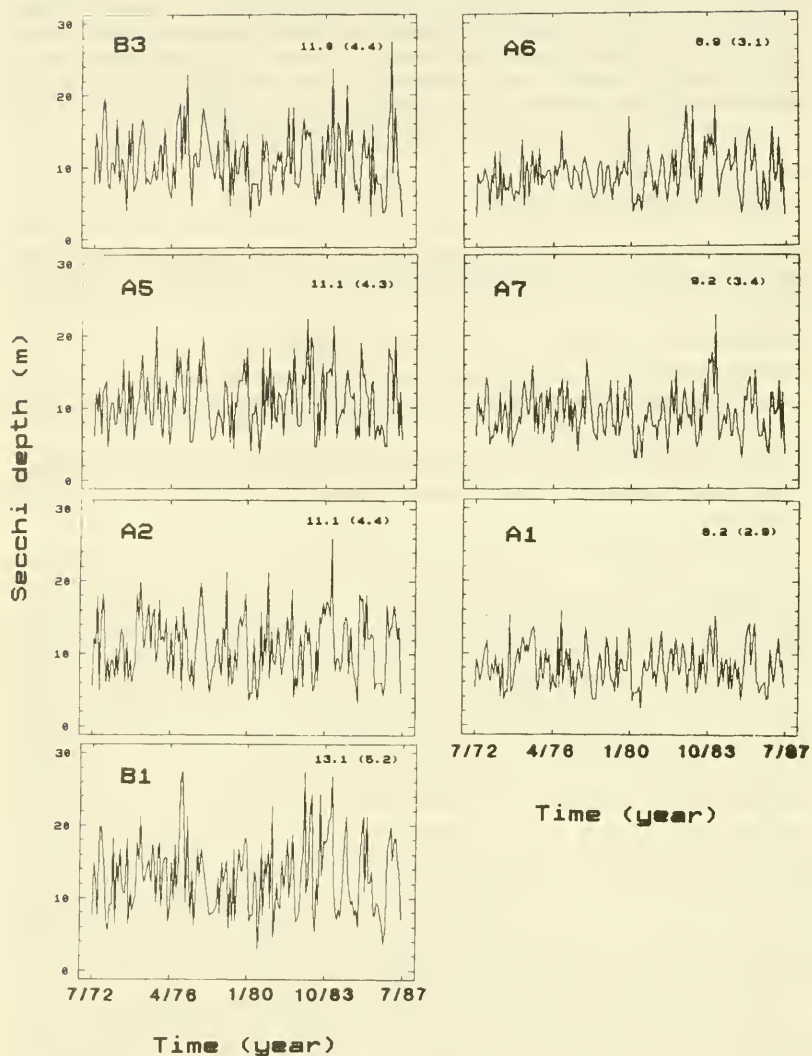


Figure 3 Seven water transparency time-series. In-shore stations are on the right, off-shore stations on the left, in the same order shown in Figure 2. In the upper right corners, means (and standard deviations) are reported. The lines are based on monthly data.



Figure 4(a) Plot of individual means of transparency (m). Bars represent the 95% confidence intervals based on pooled standard deviation. Please note that the x axis has been turned in order to emphasize the relationship between the transparency mean values and the geographic location of the stations (see Figure 4b). On the left of the plot are the results of the one-way analysis of variance (H_0 : no difference between the means of the seven stations). Based on the overlapping of the confidence intervals, the stations can be divided in three groups, enclosed in dashed lines: #1 the southern control, with the clearest waters; #2 the remaining three offshore stations; and #3 the three inshore stations, with the murkiest waters. (b) Correlation coefficients between some of the seven water transparency time-series. All are significant at $\alpha = 0.05$.

significantly. We then applied time-series analyses to investigate the pattern of temporal variability of transparency and suspended solid discharge, and their possible relations. Individual analyses of transparency at each station were performed and are reported, but, for clarity and space reasons, the figures show only the results regarding the 7 station average transparency.

The trend analysis (Figure 5a) confirms that water clarity off San Diego has not changed over the 15 years studied. This "no-change" has happened while flow has significantly increased and suspended solids discharge decreased, thanks to the improved treatment (see Figures 5b and Figure 1). This result indicates that there is an overall lack of response in this water quality property to the change in sewage discharge.

The spectral analysis of the average of all the stations (Figure 6a) shows that most of the variance of transparency is at the annual frequency band. However, the spectra of the individual stations show a reduction of the seasonal signal from off-shore to in-shore, revealing that the reduction in variability observed in the in-shore time-series (Figure 2) is caused mainly by the disappearance of the seasonal cycle and the onset of mostly random variability. In comparison, the predominant frequencies in the spectrum of suspended solid discharge (Figure 6b) are lower than 3 years, and seasonality is not an important component of the variance of this property. The same is true for flow.

The lack of a meaningful seasonal signal in the suspended solid discharge and its presence in the ocean transparency suggests that the major cycles of these two variables are driven by different forces, some long term change in the treatment for the first variable, natural seasonality for the second one.

Figure 7 shows the pattern of the seasonality for average transparency (a) and for the suspended solid discharge (b). In general, the water off San Diego is clearer in winter and more turbid in spring (Figure 7a). As observed in the individual spectra, the equivalent plots of the individual stations show this same winter/spring pattern at all off-shore stations, but this is suppressed in the near-shore stations. This suggests that transparency is affected by different processes in-shore and off-shore: for example sediment resuspension and mixing may be important processes at the stations where the depth is 30 m or less, while phytoplankton blooms may be more important for the stations where the depth is 60 m. Figure 7b shows that suspended solid seasonality is inconsequential with respect to the interannual variations.

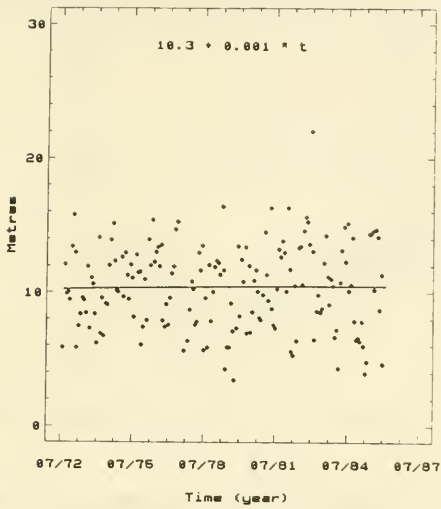
As spectral and trend analyses showed a lack of relationship between the main temporal patterns of transparency and suspended solid discharge, we did a cross-correlation test to investigate whether significant correlations at any time-lag existed. Figure 8 shows that the maximum correlation between average transparency and suspended solid discharge is at lag 0 (+ or - 1 month), i.e. neither variable leads the other. This negative correlation ($r = -0.141$) is in the expected direction for a causal relationship between these two variables (the more the suspended solids, the less the water transparency), however, it is not significant ($0.10 > p > 0.05$).

The cross-correlation between transparency and flow is also not significant at any lag.

Individual cross-correlations between each transparency time-series and suspended solids discharge show no significance at any lag for any station except A2 and A6, which have some significant values at meaningless lags (such as -1 month, transparency leading suspended solids, or +16 months).

The non-significant cross-correlations suggest that there is no causal relationship between transparency and suspended solid discharge or flow.

a) Transparency - 7 Station Average



b) Suspended Solid Discharge

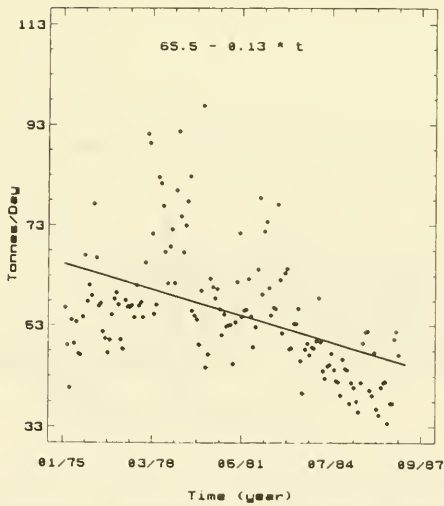


Figure 5 Linear trends (trend coefficients inside the plots). (a) Water transparency (Secchi disc depth), average of all seven stations. (b) Suspended solids discharge, monthly averages of daily data.

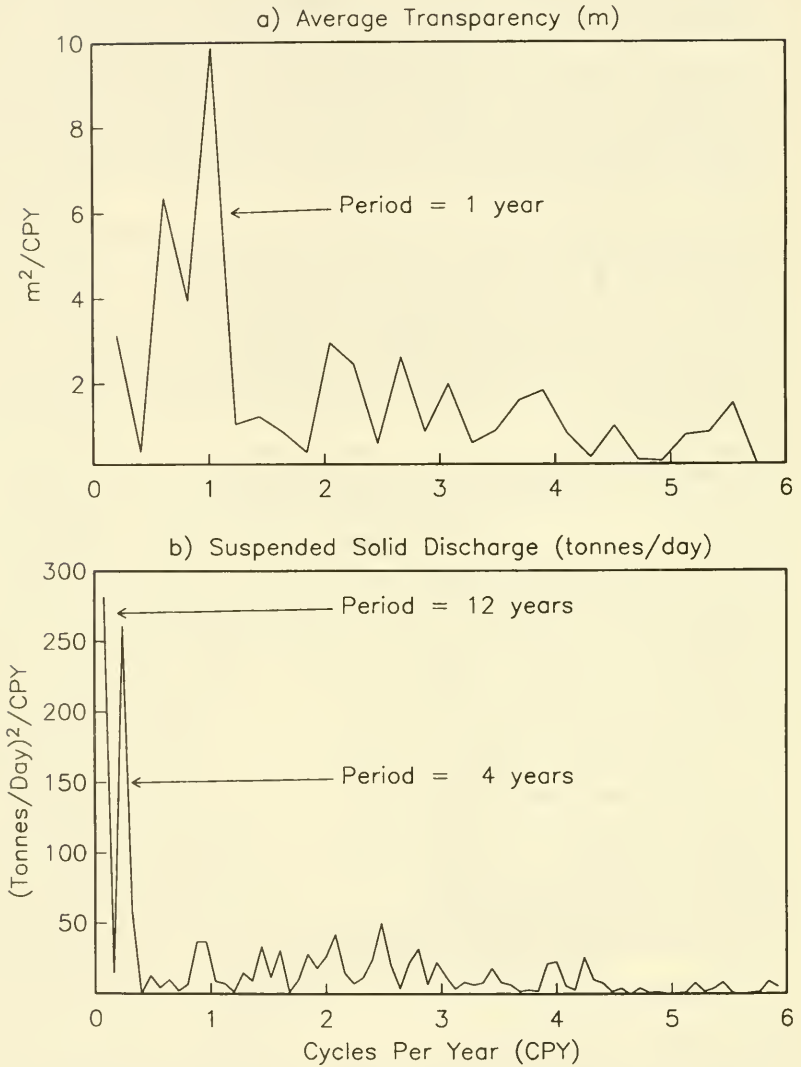
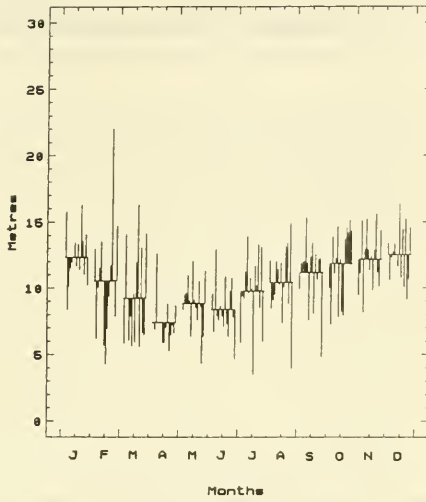


Figure 6 Spectral analysis. The arrows indicate the periodicities with most of the variance. (a) Average water transparency (Secchi disc depth). (b) Suspended solids discharge. Based on the monthly averages for convenience of comparison with a), since the spectrum of the daily discharge did not show important cycles at frequencies below 3 years.

a) 7 Station Average Transparency



b) Suspended Solid Discharge

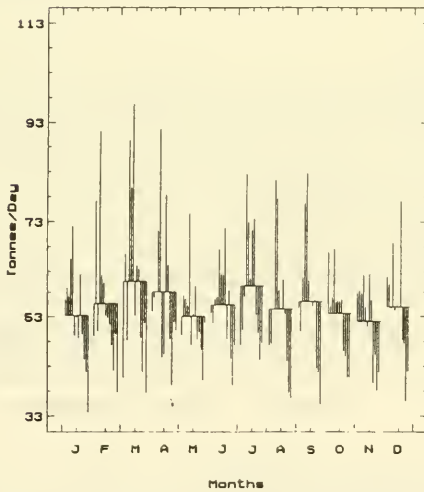


Figure 7 Monthly averages over the entire period studied. The horizontal bars represent for each month the average of the values for all years (seasonal variability), while the vertical bars represent the yearly deviations, or anomalies, from that mean (interannual and intra-annual variability). (a) average water transparency (Secchi disc depth). (b) suspended solid discharge.

Cross - Correlations

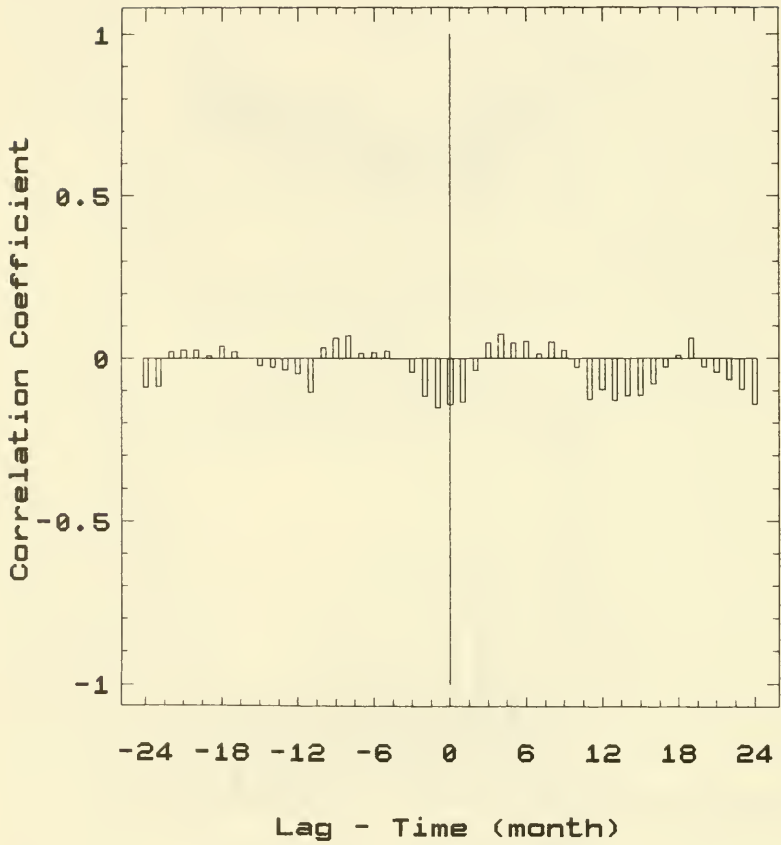


Figure 8 Cross-correlations of transparency and suspended solids discharge. The plot is drawn so that a negative lag means suspended solids lead transparency. Coefficient = 0 means no correlation, 1 means perfect correlation.

Conclusions

The spatial analysis of transparency measured for 15 years at 7 stations near the San Diego City sewage outfall shows that changes in mean and variance occurred along an inshore-offshore gradient. Analogous gradients are found in Santa Monica Bay and off Palos Verdes Peninsula, near Los Angeles (Conversi, unpublished data). In spite of these gradients, temporal variations in transparency were highly correlated at lag 0 over all 7 stations.

The temporal analysis demonstrates no overall trends in any of the 7 stations over the 15 years studied, and therefore no eutrophication in the area is implied. It also shows that an important part of off-shore transparency variance is in the seasonal band and that the inshore-offshore gradient in variance is mostly due to the flattening of the seasonal signal. The seasonal pattern indicates that the coastal water is clearer in winter and less clear in spring. Most interestingly, the spatial and temporal analyses indicate no difference in transparency between control (about 9 km from the outfall) and test (about 2–3.5 km) locations.

The temporal analysis of the anthropogenic variables displays significant trends in both variables (increased flow; decreased suspended solids discharge) over the sampled period. It also shows that most of the variability is in the interannual band.

The presence of seasonality in transparency versus its absence in flow and suspended solids discharge, the absence of trends in transparency versus its presence in flow and suspended solids discharge, and the lack of correlations at any lag between the water clarity and the sewage variables, all indicate that no causal relationship exists between sewage variables and water quality, as measured by transparency. Transparency seems to be driven by the distance from the coast and by seasonally based forces and not from the sewage discharge. In this sense, we can say that transparency fluctuations are "naturally" instead of "anthropogenically" driven.

Acknowledgements

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SCIENCE, TECHNOLOGY AND PUBLIC AFFAIRS

Q-060
LA JOLLA, CALIFORNIA 92093

May 24, 1989

Councilman Bruce Henderson
City Administration Building
202 "C" Street
San Diego CA

Dear Bruce:

The more I think and learn about San Diego's sewage problem, the more convinced I become that spending a huge sum of money in the near future for secondary sewage treatment would be a serious mistake.

I am particularly convinced by the eloquent paper by Miss Kim Shea, entitled "Secondary Sewage: A Conflict of Politics and Biology."

Obviously we do have serious sewage problems. These are related to the northward movement of the sewage effluent from Tijuana and the fragile and disintegrating condition of our sewage collector system on land. The frequent breaks which contaminate Mission Bay and other areas must be remedied by extensive replacements of this system. And something must be done to provide treatment for the Tijuana sewage.

A third operation which would remove any possible problem of contamination of the Point Loma kelp beds would be to move the existing outfall two miles further out to sea, which would place it in deeper water. This increased depth would remove any possibility of effluents--either liquid or solid--rising into the zone of life and light near the surface. But we would still be able to preserve the beneficial effect of the added nutrients from the outfall for plant life, including the valuable kelp resource.

I hope you can organize a citizens' group to work for a sensible solution to San Diego's serious problem.

Sincerely,


Roger Revelle

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SCRIPPS INSTITUTION OF OCEANOGRAPHY
OCEAN RESEARCH DIVISION

LA JOLLA, CALIFORNIA 92093

May 3, 1989

J. Bruce Henderson
Councilmember, Sixth District
City Council Office
202 C Street
San Diego, CA 92101

Dear Councilman Henderson:

I am strongly opposed to the intent to provide secondary treatment of sanitary sewage for San Diego on economic, scientific and social grounds.

Economically, the present costs of operations of the Advanced Primary Plant are less than fifty million dollars per year. The proposed Secondary Plant will cost in the neighborhood of four billion dollars per year. This is nearly a hundred-fold increase. Clearly, upgrading of the present plumbing of the treatment system is crucial. But if done properly, the effective use of the facility well into the twenty first century, with the discharge of 240 million gallons per day, can come about to the benefit of our citizenry. There is no need to tax each family in San Diego about forty dollars a month for an effort that will not improve the quality of our environment.

Ecologically, there are no unacceptable adverse impacts as a consequence of the discharge off Point Loma. Arguments are made that sewage discharge today affects the vitality of the Point Loma kelp beds and the health of divers in the area through exposure to micro-organisms. Neither of these perceptions have been validated by scientific studies. If undesirable effects from present-day sewage discharges are found, resort probably be taken to lengthening the outfall pipe.

The construction of secondary treatment plant(s) will lessen the amenities of our population through increased clogging of our freeways, both during the construction and operation periods, increased ambient noise levels during operation, and greater demands upon such services as roads, utilities, etc. These unnecessary social costs strongly conflict with any presumed gains from secondary treatment.

Finally, the billions of dollars needed for secondary treatment plants could be much better spent to improve educational, health, recreational and social goals of the community, whether the funds come from the city, state or federal government.

Sincerely,

Edward D. Goldberg
Professor of Chemistry

EDG:lsj

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OCEAN RESEARCH DIVISION

LA JOLLA, CALIFORNIA 92093

May 26, 1989

J. Bruce Henderson
Councilmember, Sixth District
City Council Office
202 C Street
San Diego, CA 92101

Dear Councilmember Henderson,

I believe that it is a serious mistake to spend billions of dollars on secondary treatment of sewage of San Diego sewage. The only data demonstrating biological or health effects of the outfall is a modest suppression of an ubiquitous and common ophiuroid near the end of the pipe and records of human coliforms in the outer kelp bed. So far as I know, the coliforms are the only indication of inshore outfall effects and they offer no clear indication of ecological problems. There is no sludge, and in fact, this is a remarkably clean outfall. We have been studying the Point Loma kelp forest since 1970, and while never specifically looking for outfall effects, have seen no ecological effects in the kelp forest. Certainly the southern end of the kelp forest is stressed (poor plant health, recruitment and settlement, heavy sediment load, etc.), but I have always assumed that these problems result from exposure to water flushed from San Diego Bay. The longshore currents tend to have a northerly trend and the plant health seems to get progressively better north of the Bay. The only data I know demonstrating biological effects of the outfall include a modest suppression of a common brittle star near the end of the pipe and occasional records of human coliforms near the outer edge of the kelp forest, usually to the north of the outfall. The alleged brittle star effect is utterly trivial and in itself can have no ecological consequence. Regarding the coliforms, it is usually thought that when the thermocline breaks down some of the sewage effluent can be transported shoreward toward the kelp forest. No doubt this happens, but it certainly causes no ecological harm and it is highly unlikely that this is evidence of any health problem. The fact that the coliforms usually appear north of the outfall tends to corroborate the northerly current trend and strongly implicates the Bay as the source of the stress of the community at the southern end of the kelp forest. Clearly money should be spent to improve the system in general, but so far as I can tell, a simple lengthening of the pipe would suffice to eliminate essentially all of the nearshore effects.

Councilmember J. Bruce Henderson
May 26, 1989
Page Two

The social consequences of secondary treatment dealing with a non-problem are mind boggling. For one thing the treatment produces a tremendous amount of sludge, the transportation and disposal of which will include great cost in the logistics, finding areas for landfill and possibly poisoning the ground water. Secondarily treated effluent is not utilized biologically and may cause a more serious benthic effect than the present outfall. In contrast, the BOD which so intimidates the EPA is available to biological uptake and in the amounts released in San Diego has never produced an anaerobic sludge field. Certainly any environmental results of this expensive treatment would be very hard to detect. It seems to me that this project is a monumental waste of money to deal with what clearly is not a biological or health issue.

Sincerely yours,

A handwritten signature in dark ink, appearing to read "Paul Dayton". The signature is fluid and cursive, with a long horizontal stroke at the end.

Paul K. Dayton
Professor of Marine Ecology

UNIVERSITY OF CALIFORNIA, SAN DIEGO

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

SCRIPPS INSTITUTION OF OCEANOGRAPHY
OCEAN RESEARCH DIVISIONLA JOLLA, CALIFORNIA 92093
May 26, 1989

J. Bruce Henderson
Councilmember, Sixth District
City Council Office
202 C Street
San Diego, CA 92101

Dear Councilmember Henderson:

As a kelp forest ecologist at Scripps Institution of Oceanography with fifteen years of research experience in the Point Loma kelp forest, I would like to add my voice in support of your efforts to obtain a secondary treatment waiver. Secondary treatment of sewage is highly appropriate for discharge into freshwater, estuaries, and confined marine bays. However, I know of no evidence that secondary treatment will improve environmental conditions or public health standards where the discharge is into deep water, open coastal habitats. On the other hand, secondary treatment may well reduce the productivity of nearshore resources harvested by sport and commercial interests, and introduce toxic valence states of certain metals, notably mercury and chromium, into the environment. Most absurdly, secondary treatment will require enormous capital expenditures without addressing the every serious issues of sewage and runoff transport to the treatment plant, e.g., the spills and frequent closings of Mission Bay because of overloaded/obsolete pipes, pumping stations, etc.

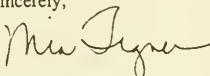
Coliform counts indicate that some sewage does impact the outer edge of the Point Loma kelp forest on occasions, and we have documented that kelp in the southern end of the forest is less healthy than in the central and northern regions. While this is obviously not an ideal situation, I would like to note that it does not appear to be a public health issue. Our research group of four to six divers has averaged about 1,000 dives per year, including regular work at outer edge and southern stations, with no medical problems. Secondary treatment will not reduce coliform counts but it is highly likely that a significant seaward extension of the discharge will solve this problem. Common sense economics dictate that we explore this option before spending billions of dollars on secondary treatment. The health of the south end of the kelp forest is more problematic. Historical records indicate that the forest once extended a mile or more to the south of what has been observed in the last three decades. Kelp stands on the present southern area are less stable than stands further north. While sewage may be part of the explanation — and the evidence is

J. Bruce Henderson
May 26, 1989
Page Two

conflicting — these stands are also strongly affected by the outflow from San Diego Bay. It is possible that sediment and even toxic materials in the Bay outflow are responsible for the present conditions of the southern end of the forest. It is also possible that physical factors such as the current regime or the nature of the bottom substrate are involved. It does not make sense to invest in secondary treatment without good evidence that sewage is responsible for the condition of the south end of the kelp forest. If sewage is involved, again extension of the outfall is likely to ameliorate the problem. I believe that an investment in a well designed research program would be a more appropriate use of public funds.

For the sake of the citizens of San Diego and the Point Loma kelp forest, I hope you are successful in obtaining a waiver. If I can be of any further assistance, please contact me. My phone number is 534-2059.

Sincerely,

A handwritten signature in dark ink, appearing to read "Mia Tegner". The signature is fluid and cursive, with the first name "Mia" and last name "Tegner" clearly distinguishable.

Mia J. Tegner, Ph.D.
Associate Research Marine Biologist

MJT:lsj

University of California San Diego
Scripps Institution of Oceanography

*Institute of Marine Resources
Ocean Engineering Research Group
Mail Code A-022, UCSD
La Jolla, CA 92093-0222
(619) 534-2561
TWX 9103371271*

April 28, 1989

J. Bruce Henderson
Councilman Sixth District
City Council Office
202 C Street
San Diego, CA 92101

Dear Councilman Henderson:

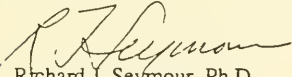
I object strongly to the proposed plan of secondary treatment of sanitary sewage in San Diego.

San Diego has a number of real, but solvable problems with its present sewer system. The spills in Mission Bay, the failing mains under Harbor Boulevard, the hydrogen sulfide problem in La Jolla and sludge dumping on Fiesta Island are a few of the symptoms of an outmoded and overloaded system. If we undertake the massive investment in a totally unnecessary secondary treatment capability, it will clearly be done at the expense of the rest of the ageing and inadequate system. We cannot afford to continue to defer maintenance and upgrading on the basic collection and primary treatment system.

It is well understood that the national secondary treatment requirements were based upon a single standard for discharge into fresh water bodies with limited holding capacities and with an overload of organics from runoff sources. Exemptions have wisely been given for many sewer systems using open ocean discharge out of recognition that secondary treatment removes compounds of great value (scarce nutrients) to the ocean and fails to remove those sewage components that are detrimental in the ocean environment. Construction of secondary treatment makes absolutely no sense for San Diego. It will harm rather than help the health of the local ocean and its cost is enormous. We will end up with a totally inadequate basic system because we will not be able to afford anything but the useless secondary treatment capability.

I applaud and support your efforts to halt this serious mistake and I will be happy to help in any way that I can.

Sincerely yours,



Richard J. Seymour, Ph.D.
Head, Ocean Engineering
Research Group

UNIVERSITY OF CALIFORNIA, SAN DIEGO

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

INSTITUTE OF MARINE RESOURCES
SCRIPPS INSTITUTION OF OCEANOGRAPHY

LA JOLLA, CALIFORNIA 92093-0218

June 15, 1989

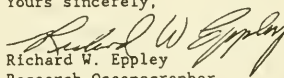
Councilman Bruce Henderson
202 C Street
Mail Station 10A
San Diego, California 92101

Dear Councilman Henderson:

I am one of the oceanographers familiar with the sea off San Diego who view secondary waste treatment with ocean disposal as unnecessary and a wasteful expenditure.

My expertise is in the relation of plankton growth in the ocean to plant nutrients, such as nitrates and phosphates. Secondary treatment will not decrease the quantity of plant nutrients released to the ocean. It will, however, more completely convert particulate organic nitrogen to soluble, mineral forms readily used by the plankton. If anything, secondary treatment will increase the release of plant nutrients directly useable by the plankton. In the past we have not been plagued with nuisance plankton blooms in response to nutrients from the waste treatment outfall at Point Loma. I don't expect we will be in future, even with secondary treatment. Nevertheless, the probability of such blooms occurring, however small, can only be increased by secondary treatment.

Yours sincerely,


Richard W. Eppley
Research Oceanographer

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA 91126

ENVIRONMENTAL QUALITY LABORATORY 105-96

June 20, 1989

Mr. Bruce Henderson
Councilmember, Sixth District
City Council Office
202 C Street
San Diego, California 92101

Dear Councilman Henderson:

In response to the inquiry from your office, I wish to offer some information relevant to San Diego wastewater disposal.

As a professor at Caltech I have conducted research on ocean disposal for many years. I am also an individual consultant on the design of marine outfalls and multipoint diffusers specializing in hydraulics and water quality aspects. At present I am engaged as a hydraulics consultant for Brown and Caldwell on questions relating to the hydraulic capacity of the Pt. Loma outfall and the related shoreline structures. In the late 1950's and early 1960's I was a consultant to the joint venture (Montgomery and Holmes & Narver) which designed the outfall.

I. Original Diffuser Design

The original design report and my notes show that the two legs of the diffuser were only partially constructed with the option to extend them later to the full length recommended by the design team. The partial completion (1344 ft out of 2160 ft for each leg) was an economy move, but it has resulted in a reduced performance of the outfall. The pipe connections exist now for adding the additional 816 ft of 54-inch pipe to each leg. This addition would require no retrofitting of the sections already built because the initial design anticipated such a completion at a later date.

This completion of the outfall would be simple and inexpensive, even if it were only an interim measure; it can be done quickly and will provide an immediate increase of initial dilution of 17 to 37%, and an increased depth of plume submergence by a few feet to up to 20 feet, depending on the ambient density stratification. This improvement would be complementary to the planned disinfection program.

This extension possibility is worthy of full consideration as another way to get some immediate improvement in water quality and realize the full potential of the existing outfall. There would also be some limited increase in total flow capacity.



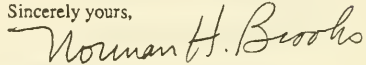
II. Proposed NRC Study

The controversy about whether Boston needs secondary treatment as part of its wastewater plan (which includes a 9-mile tunnel outfall) has provided stimulus to the development of a proposal by the National Research Council for a generic study of wastewater management for urban coastal waters. The study is intended to evaluate existing regulatory and engineering approaches and recommend ways to improve them. (The NRC is the operating arm of the National Academy of Sciences and the National Academy of Engineering.)

I have enclosed a copy of the draft proposal, which is now circulating for comments of the NRC planning committee and others. It has not been officially approved by the NRC and it has not been funded. The proposal is being managed by Dr. Steve Parker, Executive Director of the Water Science and Technology Board of the NRC, phone no. (202)334-3422.

If I can provide any additional information, please do not hesitate to contact me.

Sincerely yours,



Norman H. Brooks

NHB:fm

Enclosure

cc: Susan Hamilton/Water Utilities

Michael Anderson/Brown and Caldwell



CLEAN WATER PROGRAM for Greater San Diego

600 B Street, Suite 500 • San Diego, California 92101-4587
Phone: (619) 533-4200 • Fax: (619) 533-4267

In reply, please refer to
Chronological Number:

CWP- **111509**

July 13, 1993

Dr. Tudor Davies, Acting Deputy Assistant Administrator
Environmental Protection Agency, Office of Water
401 M Street SW (W4-551)
Washington, DC 20460

Dear Dr. ~~Davies~~: *Tudor* —

It was a pleasure to see you in San Diego last week for the Congressional hearing on the Clean Water Act. I hope that your next visit will allow you time to visit some of our facilities and meet more of the people who work on the program.

As both Congresswoman Schenk and Lisa Weil from the American Oceans Campaign - both attorneys - pointed out at the hearing, there are two sides to every argument. Having now had some time to review your testimony I hope that you will not consider it ungracious if I comment on it, presenting "the other side of the story," so to speak. My comments are arranged in the same order as your written testimony.

Secondary Treatment Benefits

There is absolutely no dispute that the requirement of secondary treatment, imposed in 1972, has dramatically improved the nation's water quality. However your argument that "secondary treatment provides substantial benefits for dischargers to ocean waters" is not substantiated in San Diego's case. You state that secondary treatment is much more effective than primary in the removal of bacteria and viruses from sewage. In San Diego the extension of the outfall to 4.5 miles offshore, discharging at a depth of 320 feet will isolate the waste field from contact with not only the shoreline (as has always been the case) but also the kelp bed (which became protected by State law 20 years after the original outfall went into operation). You also state that secondary treatment removes greater amounts of toxics. The fact is that San Diego's effluent is at or below all limits for toxics - both heavy metals and the toxic organics to which you refer. Finally, you state that secondary treatment reduces the impacts to biological communities around the point of discharge. Interestingly, in San Diego's case EPA found no significant impact to biological communities when a tentative 301(h) waiver approval was issued in 1981, but the answer changed in 1986. This reversal has always mystified us as the data upon which the 1981 decision was based showed significantly more impact than did the data upon which the 1986 decision was made. It is also surprising when one compares San Diego's data - which was used to recommend a 301(h) denial - to Orange County's data - which gained that agency a waiver.

Dr. Tudor Davies
 July 13, 1993
 Page 2 of 3

In summary - I would ask - secondary treatment benefits for whom? What would they be for San Diego? With the extended outfall there will be no problem with bacteria or viruses. With our existing pretreatment program and advanced primary treatment there is no problem with toxics. With our existing discharge there is no significant impact to biological communities.

With regards to the East Greenwich, Rhode Island, treatment plant, you don't mention in your testimony that the outfall for this plant is 400 feet long and discharges into East Greenwich Cove at a depth of only 14 feet. This is quite a different circumstance than San Diego's extraordinarily long, deep outfall discharging into the swift currents offshore of our open coast.

The 301(h) Waiver Program

You state in your written testimony, as you did upon questioning at the hearing, that the 301(h) program has been difficult to implement. The City of San Diego agrees with EPA that the delays have been interminable and that the process has been expensive and controversial. We believe that a marine standard - as enforceable as the secondary treatment standard that you currently applaud - should be the means of achieving the flexibility that you testified was needed.

NAS Report

San Diego and EPA agree that the Integrated Coastal Management approach suggested in the report makes sense. The rest of your statement focuses on a fear that the report will be used to remove the secondary treatment floor from the Clean Water Act. It is unclear why this fear should be so dramatic since you state later in your testimony that 93% of the municipalities in the country have achieved secondary treatment and that of those over 40% have gone beyond that level. Several people have asked me why EPA takes such an advocacy position on this policy question when it flies in the face of the science. I believe it is because of the difficulties with 301(h) and the desire to have a law that is enforceable. San Diego is asking for an enforceable law that makes sense for marine dischargers. As Congressman Filner said during the hearing - Please! help us figure out a way to amend the Act that works for EPA and works for San Diego and works for the public we both serve.

Environmental Benefits of Secondary Treatment for San Diego

Most of the comments you make in this section of your testimony are responded to earlier in this letter. But to reiterate, the three areas you cite as being improved by secondary treatment - viruses and bacteria, toxics, and biological communities - are all in compliance now - or will be with the completion of the outfall extension. Secondary treatment is not the answer in San Diego's case!

There are some inaccuracies in this section of the testimony that need to be corrected. You state that San Diego's discharge has significantly altered the benthic community for a two-square-mile area around the outfall and that "the dominant species has been virtually eliminated from the

Dr. Tudor Davies
 July 13, 1993
 Page 3 of 3

community" in that area. This statement simply is not true and I know that your insistence on accuracy will lead you to amend that point. The testimony in federal court of EPA's witness, Tom Ginn, and the statements of the EPA and Department of Justice attorneys is still ringing in my ears from two years ago. They clearly had a hand in this part of your testimony. It wasn't true then and it isn't now and the federal judge in the case was quite clear in his assessment that based on the testimony he heard there is no significant impact to the benthic community from San Diego's existing discharge. (See Finding of Fact and Conclusions of Law, p.9 by Judge Rudi M. Brewster, June 21, 1991.)

The statements about "heightened levels" of copper, mercury, and lead in sediments around the outfall are misleading. You say, "EPA has data" - from when? What are the levels? San Diego has the same data and what the data indicate is that the effluent limits for copper, mercury, and lead meet secondary treatment limits and that sediment levels are below those of Orange County which currently holds a 301(h) waiver.

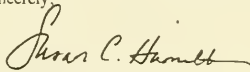
Conclusion

In the conclusion the punch-line is essentially that San Diego is going to undermine all that the Clean Water Act has achieved to date. I believe the Mayor responded to this best in her testimony at the hearing when she noted that "I have heard concerns that allowing San Diego to continue with less than secondary treatment may undermine the Clean Water Act that has accomplished so much over the past twenty years to clean up the nation's waters. I submit to you that forcing San Diego to spend billions of dollars on secondary treatment, just because the law requires it, has a far more detrimental effect on the Clean Water Act. Science should govern how we protect the environment. Isn't that what the Clean Water Act is all about? I urge you to recognize that regional differences do exist, and different locations require different environmental solutions."

Tudor, I hope that you will put on your scientist hat and help San Diego amend the law so it makes sense. We know what the current law says. We know you have to enforce it. We know we're not in compliance.

What we're talking about is changing the law - not fundamentally, because the Clean Water Act is a good law - but changing it to make sense for San Diego. Any suggestions you can make would be most appreciated.

Sincerely,



SUSAN C. HAMILTON
 Deputy Director

SCH:kw

C:\wp51\doc\PROG\MGMT\30704.LTR

Ms. Susan Hamilton
 San Diego Clean Water Program
 First Interstate Plaza
 401 "B" Street, Suite 710
 San Diego, CA 92101-4230

5342 Vickie Drive
 San Diego, CA
 92109
 May 1, 1989

Dear Susan:

Since I had to leave last week's Ramada Inn meeting before I could make a presentation about alternatives, I would like this letter to be part of the record of that meeting. As you know, I am a research biologist at Scripps Institution of Oceanography and have been attending meetings of the Task Force and the Water Reuse Committee. I am also a member of the UCSD Water Research Project. Last fall I also completed an evaluation of monitoring programs of six Southern California ocean outfalls for the State Water Quality Control Board. One of these programs was that of San Diego so I am familiar with recent results of that monitoring program.

With regard to these latter data, I am not convinced that secondary treatment is required. Environmental impact is mainly confined to a small area, the zone of initial dilution, and only occasionally is evidence found for impact beyond that area. This evidence consists of high coliform bacteria levels at depth in the kelp bed and rarely high bacteria at depth at the northern control station off Bird Rock. Coliforms can be controlled by chlorinating the effluent and I understand that this will be done at the Point Loma plant.

Nevertheless, secondary treatment is required by law as evidenced by recent City Council decisions and the EPA lawsuit. Therefore I guess the Metropolitan Sewer System is going to have to spend a lot of money on secondary treatment and decisions on various alternatives will be reached very soon.

I am in agreement with Director Frieman of Scripps that an outfall to the north of Scripps would have a strong impact on SIO activities and on the underwater reserve. Also the State Ocean Plan requires that marine laboratory seawater needs be protected and therefore a northerly outfall is undesirable. I am also in agreement with Jeff Frautschy, Chairman of the Torrey Pines Association, that the Torrey Pines State Reserve should not be impacted by the new sewer system--either during construction or during operation.

To obtain water for the City and County, we have diverted the flows of several rivers so that their mouths are the present ocean outfalls. Just as water is a resource for the people of this area, so we should also consider sewage to be a resource. Sludge can be composted and used for soil amendment, and the effluent can be used for its water resource and for its plant nutrients. Thus I am strongly in favor of plans to reclaim as much water as possible.

I have considered the various alternative plans for the new sewer system. Alternative V appeals to my senses of frugality and not wasting a valuable resource--sewage--although this alternative may be too costly, both in construction and in operation. I have some questions about this alternative: 1) Has the agricultural community in the Imperial Valley been contacted as to whether they want and/or need this resource? 2) If the secondary effluent is too saline, can it be admixed with Colorado River water to bring the salinity into acceptable limits, or can the effluent be used directly? 3) Does the agricultural community realize that the effluent would be high in plant nutrients so that fertilizer costs would be reduced? 4) Can a water marketing scheme be provided so that the Metropolitan System

could trade effluent for excess River water from the Imperial Irrigation District? Answers to these questions might make Alternative V a viable solution to our problems both with regard to construction but also to operation. I believe we have to be as visionary as possible and I hate to see a valuable resource wasted by dumping it into the ocean, even if this is always the way we have solved our problems in the past.

If Alternative V turns out not to be feasible, my second choice would be Alternative IV, since this provides secondary treatment and water reclamation in a reasonable way.

I have discussed reclamation with many people and all seem to be in favor of it as a part of the new system. However, most people are surprised that it is planned to reclaim only 25% of the sewage. We all feel that this figure is too low and that every effort should be made to reclaim a larger portion. I know that present State law prevents the use of reclaimed water as a source of potable water. However, I believe that the technology (proper disinfection) exists to use reclaimed water for potable purposes. I think that an effort should be made to change this law so that San Diego's dependence on outside water sources can be reduced as much as possible. After all, secondarily-treated sewage is discharged into midwestern rivers by many large cities and downstream cities reuse the river water for potable requirements.

Anyway, these are my present ideas and I appreciate your efforts and those of the Task Force to study and plan for our long-term needs. I also appreciate your keeping me on your mailing list of meeting announcements and I plan to continue to attend Task Force and Reuse Committee meetings as often as I can. Thank you very much for all you people are doing.

Sincerely,

William H. Thomas

William H. Thomas
Research Biologist
Scripps Institution of Oceanography

P.S. Since my opinions concern not only sewage but water issues, I would appreciate your sending the extra enclosed copy of this letter to the proper people at the County Water Authority.

cc: County Water Authority
Dr. Hassan Aref, UCSD Water Research Project



COUNTY SANITATION DISTRICTS

OF ORANGE COUNTY, CALIFORNIA

P.O. BOX 8127, FOUNTAIN VALLEY, CALIFORNIA 92728-8127

10844 ELLIS, FOUNTAIN VALLEY, CALIFORNIA 92708-7018

(714) 962-2411

July 22, 1993

The Honorable Gerry E. Studds, Chairman
House Committee on Merchant Marine and Fisheries
1334 Longworth House Office Building
Washington, D.C. 20515-6230

SUBJECT: Comments for the Record
Field Hearing in San Diego Occurring July 8, 1993
Committee on Merchant Marine and Fisheries
Issues Related to Ocean Discharge of Treated Municipal
Wastewater

The purpose of this letter is to convey comments to the Committee regarding the issue of treated wastewater discharges to coastal marine waters. The County Sanitation Districts of Orange County, the third largest wastewater management agency west of the Mississippi, has a deep ocean outfall (180 feet deep and over four miles from shore) that we have operated since 1971. Our agency has been permitted since 1985 to discharge high quality but less than full-secondary treated wastewater under the provisions of Section 301(h) of the Clean Water Act. As such, we believe that we are particularly well qualified to provide input to the Committee regarding municipal wastewater management options for coastal dischargers.

Over twenty years ago we recognized the need to use site-specific wastewater management programs that are based on local environmental and water quality conditions and that use cost-effective approaches such as industrial source control and pollution prevention to significantly reduce the amount of toxins contained in our community's wastewater discharge. For this reason our agency supported the 1977 amendment to the Clean Water Act [referred to as Section 301(h)] that provides for certain qualified coastal dischargers to receive waivers from the federal discharge standards for oxygen-demanding substances (commonly measured as biochemical oxygen demand or "BOD"), and total suspended solids, and; the across-the-board application of secondary treatment to all dischargers whether they discharge to the deep and well-mixed waters of the Pacific Ocean or to the inland waters of the midwest or the shallow embayments of the Atlantic Coast. The use of site-specific management options are allowed when the discharger can demonstrate to the satisfaction of the EPA that it can meet a statutory list of public health and environmental protection criteria that preserve the beneficial uses of the marine waters into which it discharges.

COUNTY SANITATION DISTRICTS
of ORANGE COUNTY, CALIFORNIA

Honorable Gerry E. Studds, Chairman
July 22, 1993
Page Two of Three

10844 ELLIS AVENUE
P.O. BOX 8127
FOUNTAIN VALLEY, CALIFORNIA 92728-8127
(714) 962-2411

Our 301(h) modified ocean discharge permit has saved our two million rate payers approximately \$50 million-per-year while we have focused our water pollution control efforts on the control of toxic substances at their source, minimized energy consumption in our wastewater treatment plants, reduced truck traffic needed to haul treatment chemicals to our facilities and to haul sludge (biosolids) away from our facilities, reduced air emissions from our treatment facilities, conducted the most extensive ocean monitoring performed by any municipality in the United States and protected the beneficial uses of our marine waters.

In 1989, to identify the specific tradeoffs involved in meeting full secondary vs. our blended-flow concept under our existing 301(h) program, we completed one of the most comprehensive facility-planning efforts of its kind. This process involved extensive public input, preparation of a comprehensive environmental review document which was the first of its kind to look at the cross-media tradeoffs (land, air, water and energy impacts) of various wastewater treatment alternatives. We used these findings as our basis for deciding whether to apply for a second five-year 301(h) modified ocean discharge permit. All of this was done with public participation and an overwhelming majority vote of the publicly elected officials on our governing board to apply for another 301(h) permit.

We have been able to collect the scientific information necessary to base future decisions regarding our wastewater management program and to conclude that we are protecting all of the beneficial uses of the marine waters off our coastline. We believe our programs are on the leading edge of science. Our marine monitoring program, costing in excess of \$2,000,000 a year provides good scientific information on which to base decisions. This is crucial to assuring that environment and public health are protected locally and that all applicable beneficial uses can be protected and any conflicting uses can be discussed rationally with good scientific information available on which to base decisions.

Our efforts to control pollution at its source rather than rely strictly on treatment processes at municipal wastewater treatment facilities have yielded dramatic decreases in heavy metals in our ocean discharge of approximately 80-90 percent over the past fifteen years.

We have undertaken planning to evaluate the feasibility of recycling wastewater where possible and where demands can be met in a cost-effective manner. We participate in environmental research activities that include air toxics control technology, bacterial and viral measurement techniques and wastewater treatment technology.

COUNTY SANITATION DISTRICTS
of ORANGE COUNTY, CALIFORNIA

Honorable Gerry E. Studds, Chairman
July 22, 1993
Page Three of Three

10844 ELLIS AVENUE
P.O. BOX 8127
FOUNTAIN VALLEY, CALIFORNIA 92726-8127
(714) 962-2411

EPA has recognized our efforts in the form of the 1992 Administrator's Pollution Prevention Award and Region IX's 1993 Operations and Maintenance Excellence Award for large secondary treatment plants. Yes, you heard it right. Ironically, even though we provide secondary treatment to only half of our 230 million gallons of wastewater, we are judged to have an overall program superior to other large wastewater treatment plants within Region IX.

With all of this as background, we support using good local data to make wastewater management decisions. More flexibility, more administrative streamlining, more emphasis on data analysis, and public outreach and participation in decisions are all desirable goals for the reauthorization of the Clean Water Act.

We support the concepts embodied in the recently released National Research Council Report, "Managing Wastewater in Coastal Urban Areas" which recommends more flexibility and site-specific tailoring of coastal wastewater and stormwater management systems and refocusing on source control, nutrient control in those shallow coastal areas which are impacted by nutrient enrichment, and improving pathogen monitoring techniques for public health protection.

We believe that the Clean Water Act must focus on the sources of pollution that remain while providing the flexibility necessary to be creative in our use of scarce resources to solve our remaining water quality problems. This will not be an easy task. However, we stand ready to offer specific suggestions to any legislative proposals and will offer our expertise and experience in dealing with the various provisions of the Clean Water Act as the Committee proceeds with its deliberations.

In summary, we continue to support the development and use of cost-effective and environmentally protective site-specific standards over the more costly non-specific national technology-based standards that now prevail. By their very nature, national standards can not focus on local environmental and public health protection needs. Our documented experience gives us the confidence to unequivocally state that a site-specific approach to wastewater management is cost effective and adequately protective.

Sincerely,



Blake P. Anderson
Director of Technical Services

BPA:ahh
REF #310074.LTR

457 Delaware Street
Imperial Beach, CA 91932
July 11, 1993

Hon. Gerry Studds
U. S. House of Representatives
237 Cannon Building
Washington, D. C. 20515

Dear Congressman Studds:

In a May 21, 1992, MEMORANDUM from San Diego City Manager Jack McGrory to the Honorable Mayor and City Council, San Diego, it was stated (p. 6) that the San Diego Region will require 150,000 acre feet of "new" water per year by the year 2000 and another 100,000 by 2010.

It is also stated (p. 6) that the next increment of imported water will have a marginal cost of \$1,010 per acre foot, and the estimated present day cost to distribute an AF of reclaimed water is \$600-800.

Desalinated water processed by San Diego Gas and Electric (of which it is said "San Diego is a wholly owned subsidiary") would (underestimatedly ?) cost \$1,200. per AF(p. 7). Santa Barbara recently dedicated a desalination plant which will produce water (7,500 acre feet per year) for \$1,866. per AF(p. 7).

The point of all the above is that your Committee on Merchant Marine and Fisheries is working on the wrong problem.

The problem is not whether San Diego should be removing 75% or 85% of suspended solids but whether it should be reclaiming and re-using 85% or 95% of their wastewater by the year 2010.

The goal is 100% by 2050.

With more than 90% of our water imported from the San Juan and Sacramento river basins, to the detriment of wildlife and agriculture there, and from the Colorado River, to the detriment of the Mexican people's well being, we have no reasonably moral alternative to wastewater reclamation and re-use.

As for attorney Robert Simmons contention that the City of San Diego is a "chronic scofflaw", I refer you to the July 1, 1993,

page 2

letter from the CA Regional Water Quality Control Board (RWQCB), to Milton Mills, Jr., director of the San Diego Water Utilities Dept. To remove sludge from our sewage and then dump it back in for ocean disposal_ _ _STINKS.

(A relevant quote from Dick Francis' 1989 novel, "STRAIGHT", p. 135: "Crime to many is not crime but simply a way of life. If laws are inconvenient, ignore them, they don't apply to you.")

I was told this letter would become part of the record of your Subcommittee on Environment and Natural Resources hearing on Thursday, July 8, 1993, in Solis Hall, UCSD, San Diego, CA, if I mailed it to the first name on the mailing list below.

I trust Ms Mitsos to bring the above to your attention in case it slips by your own staff.

Sincerely,

William E. Claycomb
William E. Claycomb
Save Our Bay, Inc.

Attach: July 1, 1993, RWQCB letter to Milton Mills, San Diego Water Utility Dept.

cc: Mrs. Mary Mitsos, Chief Clerk
Merchant Marine and Fisheries Comm.
1334 Longworth H.O.B.
Washington DC 20515 (w/o attach.)
Certified Mail # P239 062 540 Return Receipt Requested
Hon. Bob Filner (w/o attach.)
504 Cannon H.O.B.
Washington DC 20515
Hon. Lynn Schenk (w/o attach.)
3156 Cannon H.O.B.
Washington DC 20515

JUL - 1 1993

STATE OF CALIFORNIA—CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION9771 CLAIREMONT MESA BOULEVARD SUITE 8
SAN DIEGO, CA 92124-1331
TELEPHONE (619) 467-2952

JUL - 1 1993

June 30, 1993

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
P 419 601 985

Milon Mills, Jr., Director
Water Utilities Department
City of San Diego
City Administration Building, Ninth Floor
202 "C" Street, MS#9B
San Diego, California 92101

Dear Mr. Mills:

POINT LOMA WASTEWATER TREATMENT PLANT

It has come to our attention that the manner in which the City of San Diego (City) and Regional Board staff have determined percent suspended solids removal at the Point Loma Wastewater Treatment Plant (PLWTP) is incorrect. After correcting for this error, it is apparent that the City has been in significant noncompliance with Regional Board Cease and Desist Order (CDO) No. 87-113 and Order No. 90-32 (NPDES No. CA0107409). Under separate cover, I will be sending you Technical Change Order (TCO) No. T-2 to Monitoring and Reporting Program No. 90-32. This TCO will consolidate the monitoring and reporting requirements associated with Order No. 90-32 and make several changes in and corrections to those requirements. These changes and corrections will include new language specifying how influent suspended solids concentrations and percent suspended solids removal at the PLWTP are to be determined.

In accordance with the California Ocean Plan, CDO No. 87-113 requires that, on a 30-day average basis, at least 75% of the suspended solids in the PLWTP influent be removed before the effluent is discharged to the ocean, when the PLWTP influent suspended solids concentration is greater than 240 mg/L. The influent suspended solids concentrations used for purposes of calculating percent suspended solids removal must represent the suspended solids concentrations of raw wastewater from the entire PLWTP service area, without the addition of any in-plant or return or recycle flows or treatment chemicals. Although the PLWTP and the Fiesta Island Sludge Dewatering Facilities (FISDF) are some distance apart, they are functionally inseparable. Furthermore, sludge solids from the FISDF which are discharged into the sewer system are solids which previously were contained in and removed from PLWTP influent. Hence, the discharge from the FISDF to the sewer system constitutes an in-plant or return or recycle flow.

Crime to many is not a crime but simply a way of life. If laws are inconvenient, ignore them, they don't apply to you. Sp. 135, Dick Francis, "STRAIGHT".

Milon Mills, Jr., Director
Page 2

The suspended solids concentrations of samples collected at the current PLWTP influent sampling point do not represent the suspended solids concentrations of raw wastewater from the PLWTP service area because sludge solids from the FISDF are returned to the sewer system upstream of that sampling point. Neither would the suspended solids concentrations of samples collected upstream of the point where sludge solids from the FISDF are returned to the sewer system represent concentrations of raw wastewater from the entire PLWTP service area, because raw wastewater from a portion of the PLWTP service area enters the sewer system downstream of that sludge solids return point. An additional reason that the suspended solids concentrations of samples collected at the current PLWTP influent sampling point do not represent the suspended solids concentrations of raw wastewater from the PLWTP service area is that treatment chemicals are added to the sewer system upstream of the current PLWTP influent sampling point. Since the manner in which the PLWTP, the FISDF, and the sewer system are interconnected precludes using samples collected at a single sampling point to correctly represent the suspended solids concentrations of raw wastewater from the PLWTP service area, it appears that it will be necessary to collect samples and make measurements at two or more points and to calculate the PLWTP influent suspended solids concentration to be used for purposes of calculating percent suspended solids removal. Technical Change Order No. T-2 to Monitoring and Reporting Program No. 90-32 will address this matter.

The error in the way percent suspended solids removal has been determined has obscured noncompliance with two important requirements of Regional Board orders. First, the error results in an overestimate of percent suspended solids removal. Consequently, in many instances where the City appeared to be in compliance with the requirement of CDO No. 87-113 for 75% suspended solids removal, the City, in fact, achieved less than 75% suspended solids removal, and, hence, was in violation of that requirement. Second, virtually every instance where the City was not in compliance with the 75% suspended solids removal requirement corresponded to the return of substantial amounts of sludge solids from the FISDF to the sewer system. It appears, therefore, that noncompliance with the suspended solids removal requirement is attributable to inadequate and/or improperly operated and/or maintained sludge processing facilities which, in turn, is a violation of Provision D.14 of Order No. 90-32. The fact that substantial amounts of sludge solids were returned to the sewer system primarily during and following wet weather periods does not in any way excuse violation of the suspended solids removal requirement. Rather, it emphasizes the need for sludge processing facilities to be adequate for and properly operated and maintained under conditions that may be less than optimum for sludge processing.

Milon Mills, Jr., Director
Page 3

In recognition of Addendum No. 5 to CDO No. 87-113, Regional Board staff has met with a City representative to determine if these violations were caused, wholly or in part, by Tijuana wastewater which is routed to the PLWTP. At their meeting on March 31, 1993, Mr. Ken Theisen of Regional Board staff and Mr. Chris Toth of City staff agreed that these violations were not attributable to Tijuana wastewater which is routed to the PLWTP.

We understand that the project the City initiated in 1987 to replace the FISDF, known as the Fiesta Island Replacement Project (FIRP), is currently scheduled to be completed in 1998. However, based on the history of delays and rescheduling of FIRP, and because of the number of FIRP alternatives being evaluated, it is questionable whether FIRP will be completed by 1998, or even by 2000. We also understand that the City is currently installing sludge presses to increase sludge dewatering capacity at the FISDF. We are concerned that the planned facilities and operations will not be adequate to prevent violations of CDO No. 87-113 and Order No. 90-32 resulting from the return of substantial amounts of sludge solids from the FISDF to the sewer system. Violation of these orders is not acceptable.

Pursuant to Reporting Requirement No. E.8 of Order No. 90-32 and Section 13267 of the California Water Code, I request that, no later than August 3, 1993, the City of San Diego submit a technical report/corrective action plan containing the following elements:

- a) A tabulation comparing previously reported daily and 30-day running average PLWTP percent suspended solids removal values with corresponding recalculated PLWTP percent suspended solids removal values corrected for the error described in this letter, for the period of July 1987, through June 1993, and a description of how the recalculated values were determined.
- b) A chronology of events, for the period of July 1987 through June 1993, pertinent to the City's processing of PLWTP sludge, including changes in raw wastewater flowrates and characteristics (including suspended solids concentrations), changes in flowrates and characteristics (including suspended solids concentrations) of Tijuana wastewater routed to the PLWTP, changes in wastewater treatment facilities and operations at PLWTP, changes in sludge processing facilities and operations at PLWTP, changes in flowrates and characteristics of sludge conveyed to FISDF from PLWTP, changes in sludge processing facilities and operations at FISDF, changes in flowrates and characteristics (including suspended solids concentrations) of the discharge from FISDF to the sewer system, and any other pertinent changes in facilities, operations, quantities, flowrates, concentrations, and characteristics.

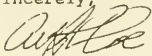
Milon Mills, Jr., Director
Page 4

- c) Identification of the anticipated sludge production rates at the PLWTP and the North City Water Reclamation Plant between now and the year 2000.
- d) A description, including process parameters and a schematic solids flow diagram, of existing facilities and operations for processing PLWTP sludge.
- e) A description, including process parameters and schematic solids flow diagrams, of and a schedule through the year 2000 for all planned and anticipated changes in the City's facilities and operations for processing PLWTP and the North City Water Reclamation plant sludge, including changes in response to directives of the Coastal Commission.
- f) A description, including process parameters and supporting calculations, of how the planned changes to the City's facilities and operations for processing PLWTP and North City Water Reclamation Plant sludge will ensure consistent compliance with CDO No. 87-113 and Order No. 90-32 in both wet and dry weather periods between now and when the FIRP facilities are fully operational.

I consider the violations discussed in this letter to be very serious. In making my recommendations to the Regional Board on options, including possible enforcement action, for response to the violations discussed in this letter, I plan to consider the City's implementation of the changes which will be directed by Technical Change Order No. T-2 to Monitoring and Reporting Program No. 90-32 as well as the timeliness, completeness, and substance of the City's response to the request in this letter for a technical report/corrective action plan.

If you have any questions or would like to meet regarding this matter, please call me at the letterhead phone number or ask your staff to call Mr. Ken Theisen at (619) 467-2971.

Sincerely,



ARTHUR L. COE
Executive Officer

BWP:pss

cc: City of San Diego Interested Parties Mailing List (Attached)

CITY OF SAN DIEGO INTERESTED PARTIES MAILING LIST

Jack McGrory, City Manager, City of San Diego
 H. R. Frauenfelder, Deputy City Manager, City of San Diego
 Harry Seraydarian, U.S. Environmental Protection Agency
 Jeremy Johnstone, U.S. Environmental Protection Agency
 Hugh Barroll, U.S. Environmental Protection Agency
 Walt Pettit, Executive Director, State Water Resources Control
 Board
 James Strock, Secretary for Environmental Protection, State of
 California
 City Council, City of Chula Vista
 City Council, City of Coronado
 City Council, City of El Cajon
 City Council, City of La Mesa
 City Council, City of Poway
 City Council, City of National City
 City Council, City of Del Mar
 City Council, City of Imperial Beach
 City Council, City of Lemon Grove
 Board of Directors, Otay Water District
 Board of Supervisors, County of San Diego
 Board of Directors, Padre Dam Municipal Water District
 John Richards, OCC State Water Resources Control Board
 David Eissler, CA Attorney General Office, LA
 Jeremiah D. Blair, CA Attorney General Office, SD
 Karen Dworkin, U.S. Department of Justice
 Ted Bromfield, City Attorney's Office, City of San Diego
 Bill Dayton, Office of the Inspector General
 Assemblyman Steve Peace
 Laura Hunter, Environmental Health Coalition
 Julie Hocking, Sierra Club
 Lee Olsen, San Diego Council of Divers
 Bill Paznokas, State Dept. of Fish and Game
 San Diego Area Wastewater Management District
 Alan Langworthy, City of San Diego Metro Wastewater Division
 Ellen Lirley, California Coastal Commission, San Diego Area Office
 James G. Giannopoulos, Division of Clean Water Program, State Water
 Resources Control Board
 Bart Christensen, Division of Clean Water Program, State Water
 Resources Control Board
 Robert Simmons, University of San Diego, School of Law, Alcala Park
 Regional Board Members, San Diego Region

DATED: June 30, 1993



SCRIPPS INSTITUTION OF OCEANOGRAPHY

June 26, 1991

MAILING ADDRESS:
9500 GILMAN DRIVE
LA JOLLA, CALIFORNIA 92093-0210
FAX: (619) 534-5306

Congressman Robert A. Roe, Chairman
Public Works and Transportation Committee
2165 Rayburn HOB
Washington DC 20515

Dear Congressman Roe:

I understand that your Committee is now considering legislation to reauthorize and improve the Clean Water Act.

One major change would result both in substantial savings of construction and operating costs of sewage disposal systems and in actual improvement of both the land and the ocean environment. This would be the exemption of certain publicly owned sewage systems where effluent is discharged into the ocean, from the requirement for secondary treatment.

The land environment would be improved because the quantity of sludge that would have to be disposed of would be much smaller if advanced primary treatment were used instead of secondary treatment. Moreover, the area of land required for sewage treatment would be much smaller if advanced primary treatment were used.

In most areas of the open sea there is a considerable deficiency of food for marine organisms. The organic matter in sewage effluent could be an important source of food for marine planktonic and benthic animals if it were not destroyed by the bacterial action of secondary treatment.

Experience near the outfall off Point Loma, California, shows that insignificant changes of the benthic fauna have resulted from discharge of primarily treated sewage. Some coliform bacteria are found in the deeper parts of the kelp forests, but this could easily be corrected by extending the outfall one or two miles farther Westward from Point Loma, and into deeper water. Scientific divers from the Scripps Institution of Oceanography have made literally thousands of dives in these kelp beds, and they have never suffered from any bacterial infection.

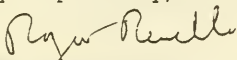
The advanced primary treatment for sewage effluents developed recently in Norway removes all but 10 to 15 percent of suspended solids from the sewage effluent. In physical terms this is as good as can be expected from secondary treatment.

The difference is that with advanced primary treatment part of the suspended solids consists of organic matter, which is highly nutritious for marine animals.

Here in San Diego the argument is made that secondary treatment of sewage effluent is necessary for water reclamation, where the water could be used for irrigation of agricultural crops. Unfortunately, the salinity of our San Diego sewage effluent is likely to be at least 1000 parts per million, too salty for most agricultural crops. This is because a large fraction of our San Diego water supply comes from the Colorado River. This water already has a high salinity by the time it reaches our reservoirs.

We calculate that the additional cost of construction of secondary treatment sewage plants, counting interest payments on construction bonds and inflation, would be of the order of two billion dollars. This is a very high price to pay for something which is not needed and is actually harmful to both land and sea.

Very respectfully,



Roger Revelle
Professor of Oceanography and
Director of the Scripps Institution of Oceanography,
Emeritus



CLEAN WATER PROGRAM for Greater San Diego

600 B Street, Suite 500 • San Diego, California 92101-4587
Phone: (619) 533-4200 • Fax: (619) 533-4267

In reply, please refer to
Chronological Number:

CWP- **111966**

August 9, 1993

Mr. Dan Ashe
House Merchant Marine and Fisheries Committee
1334 Longworth House Office Building
Washington, DC 20515

Dear Mr. Ashe:

On July 8, 1993 the House Merchant Marine and Fisheries Subcommittee on Environment and Natural Resources held a field hearing in San Diego on the Clean Water Act. Among those testifying was Mr. Robert L. Simmons, Counsel for the San Diego Sierra Club, as intervenor in the federal lawsuit against the City of San Diego.

There were a number of statements made in Mr. Simmons' testimony that require clarification or correction. This letter comments in the same order as his testimony, which is enclosed.

Mr. Simmons' statement that San Diego wishes to amend the Clean Water Act in order to "legalize (the) practice of discharging 25% of (its) sewage pollutants into our coastal water" is made based on the fact that the California State Ocean Plan requires 75% removal of suspended solids, thus leaving up to 25% in the effluent that is discharged to the ocean. While it is true that San Diego supports California State Ocean Plan standards, it is not true that 25% of the constituents of sewage that are harmful to the marine environment are discharged in the effluent. The City's industrial pretreatment program ensures that those toxic constituents such as heavy metals and chlorinated hydrocarbons be removed AT THE SOURCE rather than at the treatment plant. Pollution prevention is by far the most effective way to protect the ocean and Figure 1 demonstrates graphically the dramatic improvements that San Diego has achieved over the last decade.

Mr. Simmons calls the City a "chronic scofflaw." San Diego has sought modified standards of secondary treatment, as allowed by law and as supported by scientific data, since 1979. While it is true that in 1991 the federal court found San Diego guilty of Clean Water Act violations, the violations for which the City was fined were those related to sewage system spills -- not harm to the marine environment from the existing discharge. In fact, it was the federal judge himself who declined to approve the consent decree mandating secondary treatment saying it was not in the best interest of the public. His findings were that there is no significant impact to the bottom-dwelling community surrounding the outfall and that "any potential risk to divers in the Point Loma kelp beds will be eliminated upon the completion of the outfall extension."

Mr. Simmons says that the City has an "in your face" policy regarding compliance with the secondary treatment requirement of the Clean Water Act. That is not true either. The City asked permission to pursue a system scaled-back from the one in the Consent Decree, called the Consumers' Alternative, in federal court on July 10, 1992. Judge Brewster approved the Consumers' Alternative in court on that date and subsequently issued an order to direct its implementation.

Mr. Simmons states that "90% of all cities on both coasts have fully complied with the Act's standards at great cost to their ratepayers." This statement is untrue in any context, but it is particularly misleading since it implies that an overwhelming majority of municipalities that discharge to open coastal waters have implemented secondary treatment. The following facts will clarify:

1. Most "coastal cities" discharge their wastewater effluent not into deep open coastal waters like San Diego's but into rivers, bays, or estuaries. For example:

Providence, RI	-	Upper Narragansett Bay
New York City	-	East End Hudson Rivers
Philadelphia	-	Delaware River
Washington, D.C.	-	Potomac River
Baltimore	-	Back River
Jacksonville	-	Saint Johns River
San Francisco	-	San Francisco Bay
Portland, OR	-	Willamette and Columbia Rivers

2. Some coastal cities on the east coast discharge to open coastal waters, but the depth is far less due to the gently sloping continental shelf. For example:

Boston	-	Boston Harbor - 125 feet
Miami	-	Atlantic Ocean - 100 feet

3. Of the cities with flows exceeding 10 million gallons per day (mgd) that discharge to deep offshore waters, none have "fully complied" with the Act's secondary treatment requirement. Some are committed to full secondary -- the City of Los Angeles and Seattle, for example -- but most agencies with circumstances similar to San Diego's -- Orange County, Los Angeles County, Honolulu, Anchorage -- are operating under Section 301(h) modified standards or are awaiting the final outcome on 301(h) applications or hearings.

Mr. Simmons reiterates, again incorrectly, in Point #2 of his testimony that the court judged that the existing discharge harms the marine environment. The judge was clear in his Findings that while he found harm from the elevated bacterial levels in the kelp bed (which will be eliminated by the outfall extension), he found that there was not significant harm to the balanced indigenous population in the area of the outfall.

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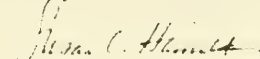
Mr. Dan Ashe
House Merchant Marine and Fisheries Committee
August 9, 1993
Page 3 of 3

Mr. Simmons states that the City does not disinfect its effluent and raises the specter of pathogens and the quarantine of the kelp beds to plant fear of water-borne diseases. He is correct that the City does not disinfect its effluent. That decision was made in federal court when the Environmental Protection Agency asked that the City be required to chlorinate during the interim period needed to extend the outfall. The scientists called to testify and the judge agreed that the potential for harm from the release of chlorine into the marine environment was far greater than any demonstrable risk to divers using the Point Loma kelp beds. With regards to that risk, the City completed a two-year study on that subject in 1986, the only one of its kind in the country, that provides valuable data on this subject. It indicated that there is little, if any, elevated risk to divers in the Point Loma area as compared to areas farther removed from the outfall. In addition, in accordance with State law, the City is currently extending the outfall to a distance and depth offshore that will isolate the wastefield from the kelp bed.

Finally, Mr. Simmons says that the Clean Water Act does not need to be amended because chemically-enhanced primary treatment can bring the City into compliance with the existing law. We wish that were true. Pilot testing is still under way to determine just how successful it might be. We will keep our fingers crossed that in this one area of testimony Mr. Simmons is correct. To date the results have shown that we can come "close" on suspended solids removal but not very close on biochemical oxygen removal. But what if we could comply using chemically-enhanced primary treatment? San Diego's position, supported by virtually every scientist of any academic credibility, supported by the National Research Council Committee on "Wastewater Treatment for Coastal Urban Areas," and supported in federal court, is that secondary treatment, however it is achieved, is not necessary to protect the environment in San Diego.

Should you have any questions, please do not hesitate to call me at (619) 533-4204.

Sincerely,



SUSAN C. HAMILTON
Deputy Director

SCH:pcs
[n:\sch\ashe.ltr]

Enclosure: Testimony of Robert L. Simmons, dated July 8, 1993

cc: Congressional delegation, w/a
Dr. Tudor Davies, EPA-Washington, w/a
Chuck Fox, EPA-Washington, w/a
Harry Seraydarian, EPA-Region IX, w/a



ENVIRONMENTAL HEALTH COALITION

1717 Kettner Boulevard, Suite 100 • San Diego, CA 92101 • (619) 235-0281 Fax (619) 232-3670

August 12, 1993

The Honorable Gerry E. Studds, Chairman
Committee on Merchant Marine and Fisheries,
1334 Longworth House Office Building
New Jersey and Independence Avenues, S.E.
Washington, DC 20515

RECEIVED

AUG 17 1993

MAIL ROOM MERCHANT MARINE
AND FISHERIES

Dear Representative Studds,

I am writing regarding testimony before Representative Bob Filner and members of the House Committee on Merchant Marine and Fisheries. At the Committee's field hearing here on the Clean Water Act on July 8, 1993, expressed a high degree of confidence in the City's Industrial Pretreatment Program's (IPP) removal of toxic chemicals from their effluent prior to its discharge into the sewer system.

Unfortunately, because of the results of EPA's 1992 Pretreatment Performance Evaluation of the San Diego's IPP, we are not able to share this confidence in the IPP's effectiveness. According to that evaluation:

"Categorical industries have failed to reach compliance equivalent to the technology-based standards. At least 44% of the categorical industries in 1991 were in noncompliance. San Diego failed to provide schedules necessary to bring industries into compliance through pretreatment technology."

We feel it is important for you to know that the IPP is not so effective as was suggested at the hearing. This is particularly true when considering whether secondary treatment is warranted, given that the IPP has demonstrated serious noncompliance and that secondary treatment is, according to Tudor Davies of EPA's Office of Water,

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Board of Directors

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Utility Consumer Action Network
Tony Petina, MA, Treasurer
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"Working for Toxic-Free Communities"



Pesticide Use Reduction

"considerably more effective than advanced primary treatment in removing toxic organic pollutants and some metals....from sewage" (testimony before the House Committee on Merchant Marine and Fisheries on July 8).

According to Mr. Davies, EPA has data that shows that sediments at stations nearest to San Diego's outfall have elevated levels of toxic pollutants including copper, mercury and lead. The outfall extension alone will not reduce the volumes of toxic pollutants reaching the ocean. The need for improvement in the implementation and oversight of the IPP is clear. There is also a need for aggressive pollution prevention programs in industries that generate hazardous wastes -- waste prevention (that is, not producing the waste in the first place) is the least costly and most effective way to protect workers, the public and the natural resources and to obviate the inevitable need for astronomically expensive environmental cleanups.

The testimony also stated that because the City's IPP is so effective in removing toxic chemicals, the sludge from the Point Loma Wastewater Treatment Plant is of such high quality that 100% of it can be beneficially reused. First, we have already explained why the high quality of the sludge is in question. Second, whether its because the City has not been able to find sufficient markets for its sludge, it has been returning large volumes of it to the Point Loma Plant. In fact, the Regional Water Quality Control Board (RWQCB) recently wrote to the Water Utilities Department regarding these return flows and the City's practice of double counting the sludge in its calculations of percent suspended solids removal. This practice has resulted in tons of illegal dumping into the ocean over the past five years -- for example in March of this year, 651 dry tons over the limit.

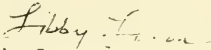
To address these serious violations, the RWQCB required the City to submit a technical report/corrective action plan by August 3, 1993. The RWQCB received them today but the City has continued the illegal dumping, further aggravating its noncompliance with the RWQCB's orders. These violations are very serious and the City's continuation of them is very troubling.

It must be emphasized that the illegal dumping not only violates the allowed discharge of total suspended solids but also adds to the pollutant loading of toxic chemicals into the ocean. It is our understanding that if it weren't for

the City's practice of returning sludge to the Point Loma Plant, using chemical treatment, it could achieve 85% removal of suspended solids. This level of removal is the minimum acceptable for the adequate protection of receiving waters and sediment from toxic chemicals bound to the suspended solids in wastewater.

We appreciate that you and your fellow Committee members, and Representative Filner held the hearing here in San Diego. If you would like more information on the issues we addressed in this letter, please contact me at 619 235-0281.

Sincerely,


Libby Lucas
Research Associate

cc: Representative Randy Cunningham
Representative Bob Filner
Representative Lynn Schenk
Whitney Ghoram, San Diego Regional Water Quality Control Board
Ken Theisen, San Diego Regional Water Quality Control Board
Ron Duff, State Water Resources Control Board

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